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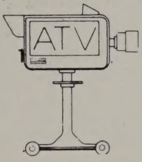
AMATEUR TELEVISION MAGAZINE

A5

DEVOTED TO HAM TV



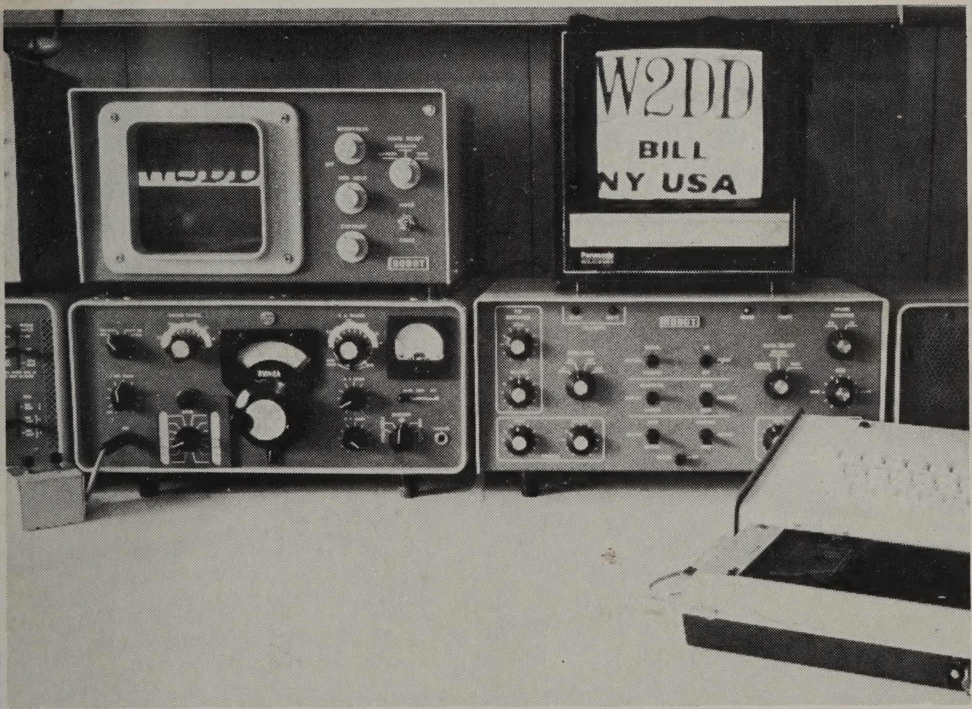
MARCH — APRIL '76

FCC, "ATV RPT -- YES"

DETAILS INSIDE......

97.61(c) SUSPENDED!!
SSTV DIRECTORY BY ROBOT

AND MUCH MORE.......



SPECIAL W2DD Bill DeWitt AND W9NTP Don Miller.....

TELL ALL YOU WANT TO KNOW ABOUT SLOW SCAN TV!

A5

Amateur
Television
Magazine

VOL. 6
NO. 2

OH WOW !!

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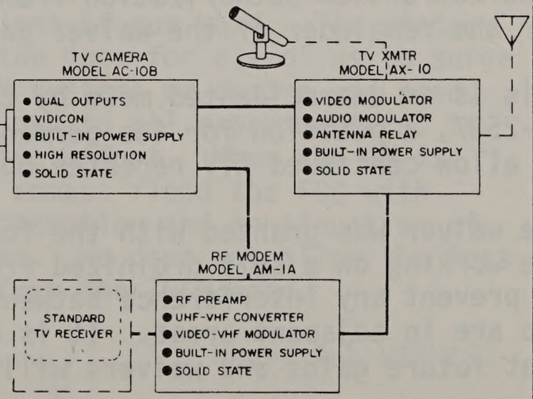

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LARRY ZAKEM K8PMW

FCC OKs ATV RPTs

Yielding to unrelentless pleas from Bruce Brown WB4YTU and Metrovision, the FCC ordered a one year waiver of 97.61c of the rules to permit fast scan TV repeater stations in the 450 Mhz band.

Effective February 27th, this allows all present repeater license holders to utilize 450 for ATV use. Those who applied but do not yet have a repeater license must wait for its arrival. Those who already have a repeater license need no furthur authorization from the FCC to operate ATV for the remainder of the waiver period.

This is an unprecidented move by the FCC while it considers RM-2507, a petition for the permanent abondonment of 97.61c to allow continued ATV repeater operation in the 450 band.

The waiver was granted with the foreknowledge that the amateurs are working on a self orginized frequency co-ordination effort to prevent any interference between various groups of users who are in adjacent areas. It is only through this effort that future gains and waivers will be granted.

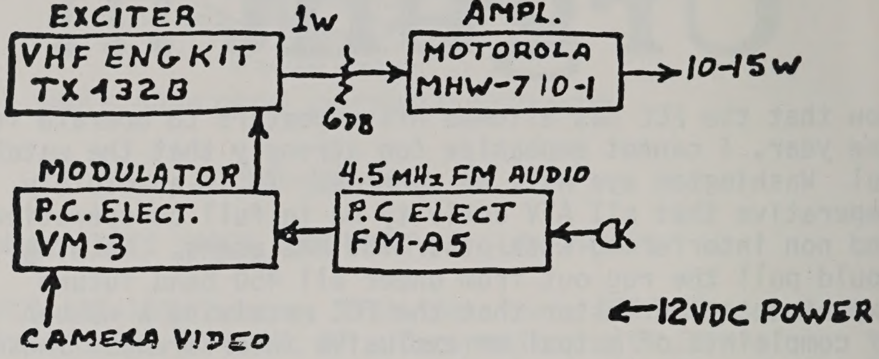
Urgent !!!

Now that the FCC has allowed ATV repeaters to operate for one year, I cannot emphasize too strongly that the watchful Washington eye will be upon us. It is absolutely imperative that all ATV activity be in full co-operation and non interfering with other 450 Mhz users. Nothing would pull the rug out from under all 450 band future experimentation faster that the FCC receiving a number of complaints of mutual or exclusive interference. Those of you who will be within the coverage area or nearly so of another repeater take heed. I would strongly suggest that we follow the same procedure of other TV services. In areas of congestion, to minimize interference, follow a plan of offset carrier frequencies. The RPT outputs should be 10 or 30 Khz apart and the inputs should be + or - 10Khz. This allows those who are between RPT sites to adjust their receiver or transmitter frequencies (both of which are well within the capabilities of any TV tuner or converter and also within the reach of any transmit netting control) to avoid direct on frequency interference.

I feel certain that the FCC will propose rulemaking that will eventually limit the maximum bandwidth of 420-450 activity in such a way as to preclude ATV activity. Only by keeping a clean house will we be able to preserve not only the ATV activity, but ALL EXPERIMENTAL UHF activity which uses "exotic" modes. I am sure that before the year is up, we will have to have a final battle with the power that desire portions of our band. The victory of Metrovision has opened the door for all of us to surge ahead and establish the ATV systems we desire and need. It is now up to all of us, and to all experimenters, to provide a uniform cooperative effort. When the RM is announced, we will need to enmass flood the FCC with favorable comments of the operation and continuation of ATV and other wideband modes. We dare not allow the loss of the experimental modes from the 70CM band.

an editorial by....... Henry Ruh WB8HEE

GO SOLID STATE ON A5



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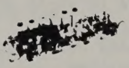

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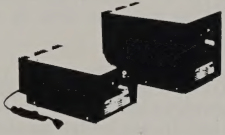

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KEYBOARDS

qwertyuio
asdfghjkl
zxcbvmn

Applying the Datanetics Elastomer Keyboard to the W0LMD Electronic Keyboard

by L. M. Butsch Jr. K4CNP

The keyboard has found its place in the paraphernalia of the SSTV enthusiast and many have been homebrewed and purchased for TV use. It is the purpose of this article to describe how the Datanetics mechanical keyboard may be successfully applied to the electronics printed circuit board made for the circuit of Dr. Robert Suding, W0LMD, and to update the features available for the keyboard.

It was recommended by Dr. Suding in his article to avoid elastomer type keyboards when constructing the SSTV keyboard system that he described (1). There were good reasons for that recommendation and it behoved me, since I already owned such a board, to find out what problems were involved and to find ways to overcome them.

The primary problems are based on two characteristics of the Datanetics and other similar elastometric type keyboard systems. First, the physical construction of the keys switching system is such that it has a severe point bounce problem and an even worse de-bounce system. Second, the Datanetics board is electronically constructed on multi-layer printed circuit boards which has a self capacitance factor between the layers of foil which occasionally causes a pulse pickup or crosstalk problem resulting in faulty readout. While working on the first problem a system was integrated to provide a novel way of shifting from lower to upper case was discovered by Don Quint WA3KIR/2 and this has been incorporated into this conversion. The new system eliminates the jury rigged microswitch and the use of the keys on the right hand side of the keyboard for printing the upper case characters associated with the numerals.

Bouncing Along

The bounce problems show up as multiple printouts of the characters struck and can be eliminated by the correct amount of integration in the keyboard decoder. The capacitive interlayer signal problem is also handled in a similar manner.

The pre-wired multilayer circuit board is designed such that the 6 X 8 matrix of characters shown in CQ Magazine (1) cannot be realized. In addition the PC board is wired for a 16 X 3 matrix which necessitates a modification of the encoder circuit. Figure 1 shows the modification of the decoder to allow it to work with the Datametrics keyboard. In addition, there is one modification to the keyboard itself, the memory input capacitor which governs the speed of writing (C2). The .01 mfd cap was chosen to set the time transfer of information in the "catch register" IC's, 1, 2, 3 in a period of time ranging from 50-100 micro-seconds, then reset the catch register. Such a short period of time is quite critical and causes the bounce problem to generate multiple entries. This is overcome as Dr. Suding describes by slowing down the process with the introduction of an increase in the value of C2 to .5 ufd or so. This represents a slowdown factor of 50 and should eliminate the bounce problem. Since no two keyboards are exactly the same, some experimentation in the actual value will be necessary to optimize the cure.

To overcome the problem of debouncing, it may be necessary to change the encoder resistor and capacitor values as indicated in figure 1. Pinouts for the datanetics keyboard are indicated along the right side of the character matrix and should be connected as shown in the diagram.

There is a method for checking the operation of each and every key on the Datanetics keyboard Pin 10 on the lower row, counting from left to right when viewing the unit from the rear is common to every key on a properly working board. With that in mind, using an ohm meter, it is possible to track the individual paths through the keyboard PC wiring of each key. By connecting the ground lead of the meter to pin 10 and then individually depressing each key, you can check the continuity to each of the upper pinouts, and do likewise for the lower set of pinouts. The upper level will show about 4 ohms with the key depressed and the lower level will measure 15 to 25 ohms. Some special character keys will only check between pin 10 and the upper level pinouts.

CONTINUED - - -

KEYBOARDS

ENCODING

One simple approch to construction is to use ordinary vector board and run bus bars for horizontal and verticle matrix members, and connect the diodes between them. The board should be large enough to allow room for the inclusion of the additional transistors and other circuit elements needed. My original system used a microswitch (Radio Shack # 275-016) under the shift key separately wired to the proper places in the encoder. A better method suggested by WA3KIR (2) is more sophisticated and doesn't require that you run wires around and under the keys. In the case of my particular keyboard, I had to place a micro-switch under the space bar to eliminate multiple keying; however, most people using this encoder have been able to eliminate that switch and use the space key pinouts by adding capacitance to the encoder.

With regard to using the CTRL key for upper case shift, that key is located just to the leftof the letter A (for the benefit of those who have exchanged key caps). To use WA3KIR's words, the key CTRL will perform the shifting function if the following changes are made as shown in figure 2:

1. Remove the shift microswitch if already installed and put a jumper in that position.
2. Find connector H on the keyboard edge connector. Looking at the keyboard as it is usually positioned for use, H is on the top row of pins, eight from the left.
3. Connect H to the 220 ohm resistor of bit 6 transistor at the same point the space switch is connected.

With this modification, the keys on the right side will provide upper case characters when the CTRL is depressed. It is quite easy to remove the CTRL keytop and replace it with the SHIFT keytop by simply lifting the keytops from the fingers to which they are attached.

Finally, Anthony Pessiki, W3GKW (4) has manufactured "piggy back" PC boards that add several elegant functions to any W0LMD type keyboard. He has small PC boards that permit back space, digit and line location of the last character entered, and double height letters with or without a two-row, four-row format. I've found these additions very useful especially the double height letters as they are much easier to read under adverse conditions.

(1) An SSTV Keyboard, Dr. Robert Suding,W0LMD, CQ Magazine,Sept. 74.
(2) Dr. Don H. Quint,1964 Red Coach Rd.,Allison Pa. 15101
(3) Russell F. Sievert,W8OZA, 1411 Lonsdale Rd.,Columbus, O 43027
(4) Anthony Pessiki W3GKW, 1618 Pulaksi Dr.,Norristown, Pa.19043
(5) L. M. Butsch, K4CNP, 1590 Bel Keene Rd., Clearwater, Fla. 33516

CONTINUED

ATV AWARD

A "GOOD IMAGE" award has been created by A5 to be given to the individual or group which has made the greatest contribution to amateur television. To be awarded at the Dayton Hamvention ATV Forum, the Award consists of an Image Orthicon tube ("good image")with inscribed holder,

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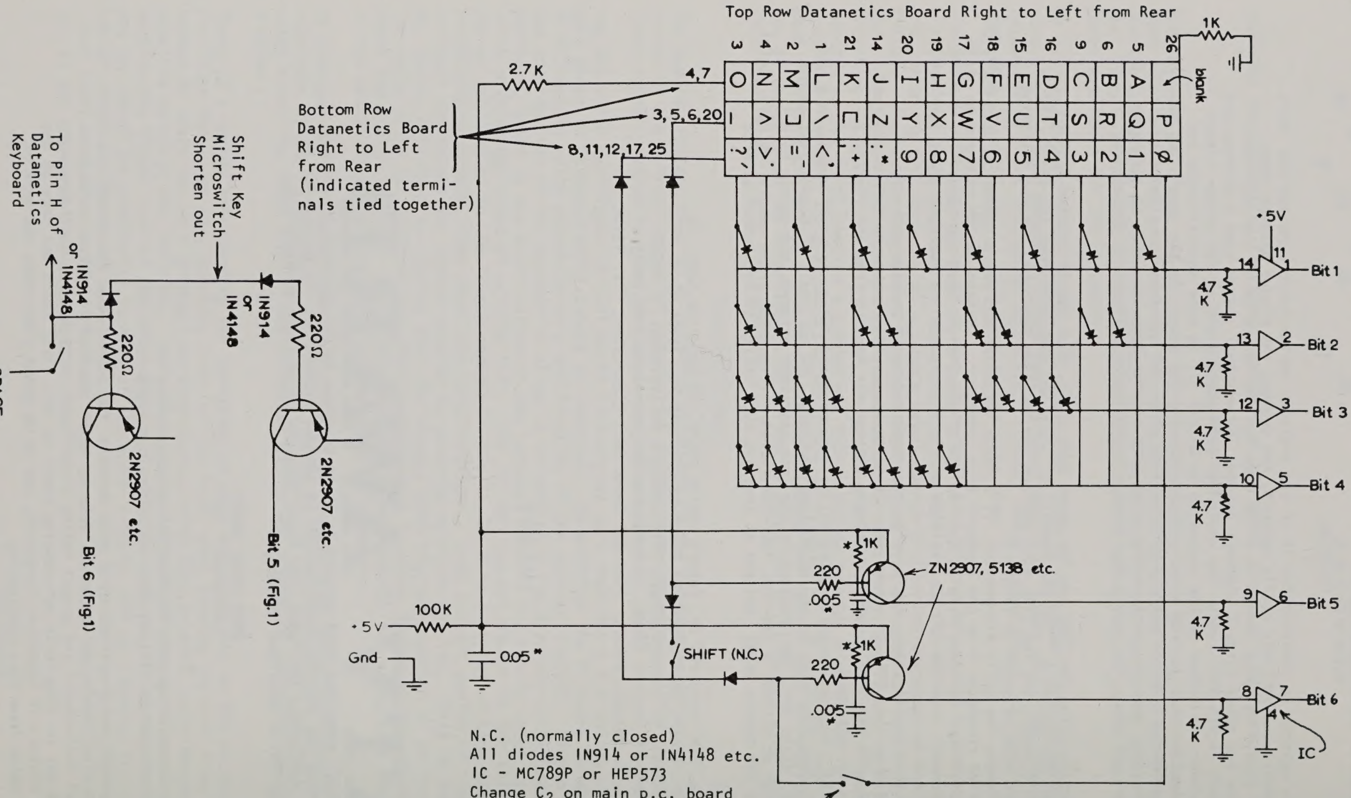


N.C. (normally closed)
All diodes IN914 or IN4148 etc.
IC - MC789P or HEP573
Change C_2 on main p.c. board
to at least 0.25µf

N.O. (normally open)

(either pin 9, lower row of Datanetics board or microswitch - I kept getting double spacing when using pin 9, lower row)

SSTV SIGNAL REPORTING

by Thomas Pollock WB6ZYE

In October of 1966, SSTV pioneer Capthorne MacDonald obtained permission to experiment with SSTV on amateur radio and on Navy MARS. Since that time considerable effort has gone into the technical improvement but not much progress has been made in instituting a suitable reporting system. One of the projects of the Navy Marine Corps MARS SSTV Speciality Network which was established in 1972 has been the development of a practical reporting system for general useage.

The time-tested R S T system was a logical place to start. With the readability R, the signal strength S and the video quality V we come up with R S V. Several variations of the designations for the quality of the video were tested commencing with nine gradations. These soon became too cumbersome and were discarded. Mr. Ken Wood Jr. K6IIS and NN0QXJ threw out all of the extraneous dope and came up with a system that has the key information you want 95% of the time.

This system has been in use for about 18 months with very good results on the Navy Marine MARS SSTV Specialty Network which meets at 2100Z on Saturday and Sunday on 13975.5. It permits reports to be made quickly and if you are so inclined you can make a chart of the reports and have a record of two way propagation between a large number of stations scattered over a large geographical area.

The R S V reporting system varies from conventional R S T in that the picture quality is not progressive. It is possible for a V3 picture to be better than a V4 picture. The system is as follows:

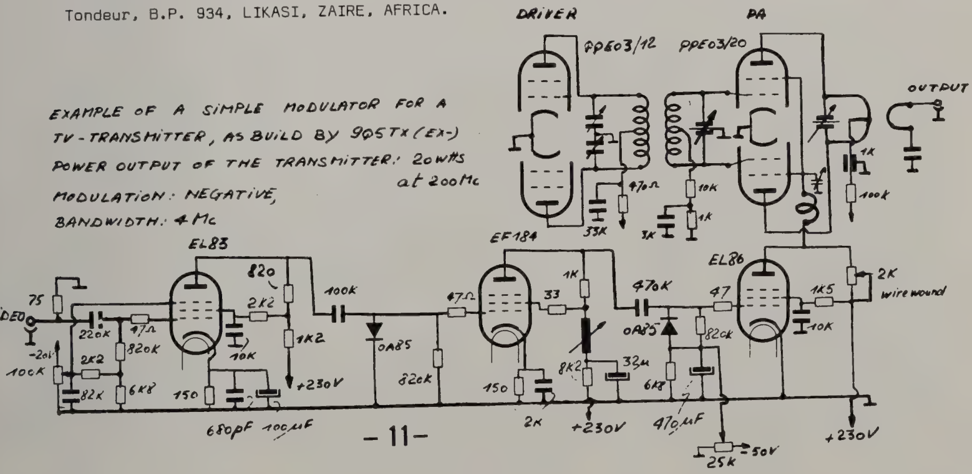
V5....closed circuit quality picture
V4....good pictures with multipath
V3....good pictures with interference
V2....readable pictures with multipath and interference
V1....mostly unreadable-loses sync-picture interupted.

Using this system, a report can be made on net in six seconds as follows: "this is WB6ZYE, I receive W1JKF 5-6-5: K4UMF 5-8-4: W9NTP 5-9-5 out." This system is good for reporting radio and video reception on QSL cards, on voice or by video pictures and is particularly valuable for nets or contests where time is of the essence...try it, you may like it.

---

g2 VIDEO MODULATOR AT ex-9QRTX.

John Tondeur, ex-9Q5TX reported the excellent performance of his video modulator, modulating the g2 a QQE03/20. With the trimmer in the g2 circuit, tuning for maximum bandwidth is easy. John's transmitter functions daily as local TV network for the LIKASI TOWN ; vision on 199,25 MHz, sound on 205,75 MHz, 625 lines, negative modulation. He is on the outlook for info on the construction of broadband amplifiers with 4X150A or 4CX250B (min. bandwidth 5 MHz) and low-level mixer modulators. John Tondeur, B.P. 934, LIKASI, ZAIRE, AFRICA.



EXAMPLE OF A SIMPLE MODULATOR FOR A TV-TRANSMITTER, AS BUILD BY 9Q5TX (EX-)
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MODULATION: NEGATIVE,
BANDWIDTH: 4 Mc

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NEW PRODUCTS

The KLM 420-450-27 UHF Antenna

For many years it has been instilled in this writer that no commercially made antennas ~~made~~ for the 440 MHz band were worth their weight in sheep dung. Tales of woe from unfortunates who had unwaryingly purchased these aluminum dummy loads furthered our belief that the only good UHF antenna was one carefully produced in ones own shack, providing careful attention was paid to all details and the proper chants to the antenna gods were voiced.

For a number of years we had successfully used Tilton's wood frame 48 element colinear (see any edition of the ARRL VHF Handbook) with good results. It had good gain and the bandwidth needed for ATV work; besides the antennas were constructed from scraps out of the woodpile and the antenna appealed to my cheap nature.

Last summer we saw an add for the KLM 420-450-27 antenna. All those numbers simply mean that the antenna will cover from 420 to 450 MHz and the antenna has 27 elements. The manufacturer claimed 16.7 db gain over isotropic. All this from a ten foot seven pound wonder.'Ha'said I 'an obvious case of consumer fraud'. I promptly wrote out a check for one and mailed it in, gleefully awaiting its arrival so I could build it and prove what a piece of junk it was in an special expose in A-5.

The package arrived in short order and soon the antenna was assembled. Two locals were fished into the task of climbing my 60' tower and exchanging my old faithfully collinear with the KLM. That evening as all the local ATVers were warming up thier transmitters we prepared to put the KLM through it paces. Al bet he would be about 50% snow(he's usually DFQ) I thought I wouldn't even see him! We both lost. He was the same as usual, walking off of the screen! Aha, had he finished that 500 watt amp and was having fun with me? As he panned the camera across his shack I soon saw he was running his stock T-44. The KLM did work!

As close as we could measure, the antenna is as good as the 48element colinear, and certainly within 1 or 2 db of it. A worth while trade considering the reduced windload and the 10 pounds less weight of the KLM. The antenna uses the Swan multidriver system to partially achieve its bandwidth, and carefully cutting and spacing of the elements does the rest. For the sidebanders, KLM offers about the best line of gain antennas for 50 through 450 MHz. They are gaining popularity with moonbouncers (what more can be said) and doing well in amateur field strength measuring contests.

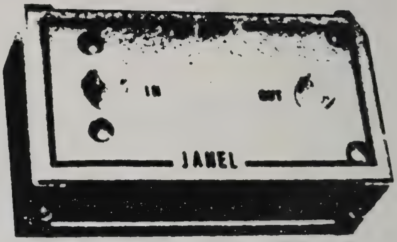
KLM offers a 50 ohm to 50 ohm unbalanced balun to match the antenna to coax lines. They also offer power splitters to stack any numbers of these antennas to produce what ever gain you need.

In conclusion, this antenna is a best buy for the ATV'er looking for an antenna designed to meet his needs. The only negative thing I can comment on is the price, current price is 39.95 for the antenna and13.95 for the balun. But then again you get what you pay for, and I have heard of people paying more and getting a lot less.

440 MHz Preamps

model 432PA

only $33.00



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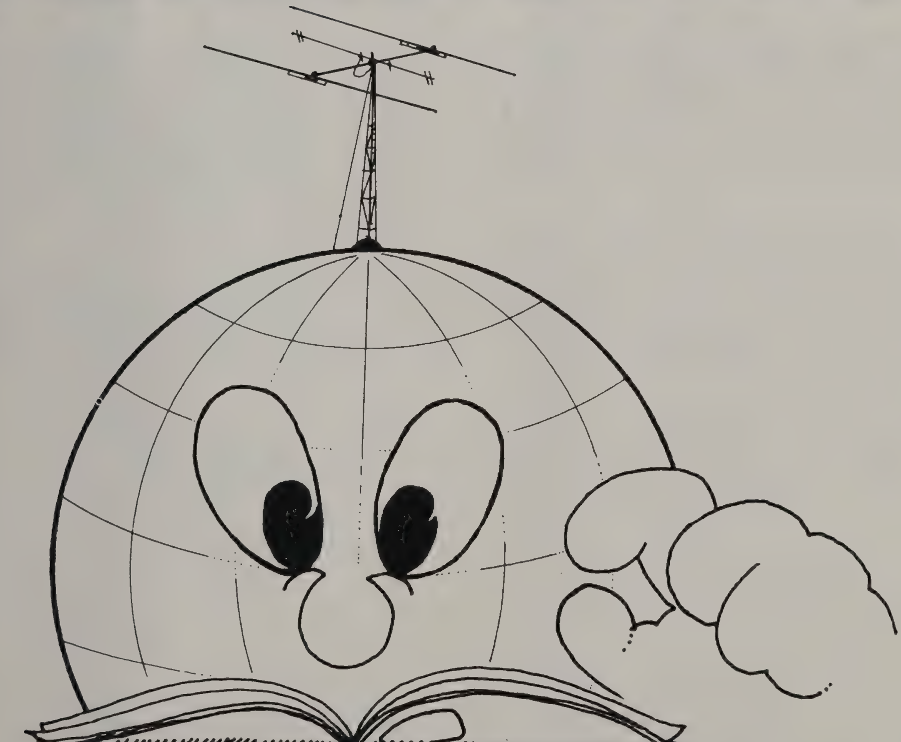
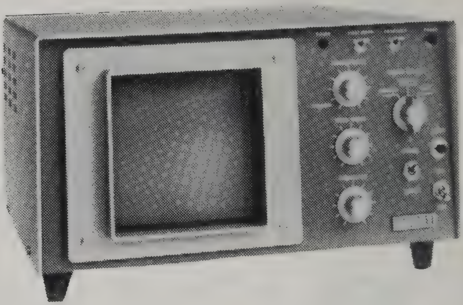
ROBOT RESEARCH



ROBOT MODEL 70C AND 70D SLOW SCAN TV MONITORS

- 128 OR 256 LINE PICTURE DISPLAY.
- VERTICAL RETRACE OVERRIDE.
- FAST SCAN CAMERA VIEWFINDER MODE.*
- "VIDEO GRAPH" DEMODULATED SSTV WAVEFORM DISPLAY.*
- DOUBLE TUNED CIRCUIT INTERFERENCE REJECTION.
- AUTOMATIC SYNC SEPARATOR.
- TUNING INDICATOR.
- SIX INCH DISPLAY.
- PHONE LINE OUTPUT.
- COMPLETE STATION CABLING.

*Model 70D only.



The ROBOT Model 70C and 70D Slow Scan Television Monitors demodulate and display pictures transmitted by amateur radio stations from around the world. A simple connection between the ROBOT Monitor and your existing radio receiver audio output is all that is required for you to receive SSTV pictures.

Amateur radio SSTV operates in accordance with standards which are accepted around the world, and the ROBOT Monitors are designed to receive pictures according to these accepted standards.

Both the ROBOT Model 70C and 70D Monitors are able to display either 128-line or 256-line SSTV pictures. For 128-line SSTV pictures the SSTV horizontal line rate is 15 Hertz and a full frame requires 8.5 seconds. For 256-line pictures the line rate is 7.5 Hertz and a full frame requires 34 seconds. Both monitors also feature a manual push-button for re-setting the vertical position of the sweep at any time. After first few seconds of sweep this push-button overrides the automatic vertical sync detector built into the sweep circuitry.

The ROBOT Model 70D Monitor also doubles as a Fast Scan View-finder for ROBOT Cameras. In the Model 70D Viewfinder mode, the ROBOT Camera's Fast Scan video output is displayed on the Model 70D Monitor in a manner identical to that of the ROBOT Model 61 Viewfinder. This fast scan "moving" picture aids in rapid set-up of Camera subject matter, lighting and focus. Slow scan pictures cannot be received simultaneously in the Viewfinder mode.

The ROBOT Model 70D Monitor also doubles as an oscilloscope display of the demodulated waveform of the received or transmitted SSTV picture. In this "Video Graph" mode, the Model 70D displays each line of SSTV with a one-line horizontal time base and vertical deflection proportional to SSTV signal white (2300 Hz) or black (1500 Hz). By observing this waveform while tuning your station receiver or while setting up your ROBOT Camera, optimum receiver tuning and best settings of Camera Brightness and Contrast controls are obtained. Slow Scan pictures cannot be displayed simultaneously in the "Video Graph" mode.

If a separate oscilloscope is available, the demodulated SSTV waveform may be displayed by means of the Auxiliary Video out-put on the oscilloscope while viewing the SSTV pictures or Camera Fast Scan picture on the Model 70D Monitor.

The video of SSTV is limited to 2 KHz so it will be compatible with voice band communication equipment such as radio and telephone. Such a narrow band is obtained by sending a new picture every eight or thirty-four seconds (broadcast TV sends a new picture every 1/30 of a second) and using 128 or 256 scan lines (broadcast TV uses 525 scan lines). The picture is retained on the monitor by the persistance of a P7 cathode ray tube. This display is much like a radar set, which also uses a P7 phosphor. Best results are obtained when the monitor is operated in a darkened room or a light shielding hood is used.

The ROBOT Monitors contain the power supply for any companion ROBOT Camera. The Monitor also contains the control and wiring facilities needed to integrate SSTV into your existing station. The Monitor is a receiver only. To transmit pictures, either a ROBOT Camera or tape recorder is required.

PRICE

Model 70D	$445.
Model 70C	$345.

ROBOT RESEARCH, INC.
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[714] 279-9430

K1ACX	G. Tetrault
W1AW	American Radio Relay League
W1AWZ	Les Cushman
W1AZP	A.J. Mitchell
W1BFO	G.G. Fazio
W1BGW	Jack Berman
W1BHD	Melvin Dunbrack
W1BHZ	Thomas Carter
WA1BJY	Aurclio Santos Silveira
K1BVB	Arnold Gorevitz
W1BYU	Ed Safrine
W1CJK	William Werenski
K1CUW	Jack Kohn
WA1CZG	Alan Miner
W1DGJ	Mike Ludkiewicz
W1DHZ	Skip Tenney
WA1DQK	Merle Dodge
K1DWZ	Kenneth King
K1EER	Donald Hornbeck
W1EGP	Lindsley Clarke
K1EPL	Andrew G. Osterberg
WA1ETA	Fred Walsh
WA1EYX	Daniel Ross
W1FUQ	Frank Somers
W1FVD	Phillip Walker
W1GAU	Harvey Horowitz
W1GEU	J.F. Gillis
W1GFU	J.F. Gillis
W1GGQ	Frederick Patten
W1GKN	R. Williamson
WA1GND	James Tingley
K1GNX	Steve Dias
K1GOT	L. Ring
K1GRT	Leo Cavanaugh
W1HQO	John O'Connell
W1HSC	Warren Cann
W1IA	Gordon Stanys
K1IHA	Paul Breton
W1JFK	Barry Green
W1JKB	Charles Lewis
W1JKF	Richard Kendall
W1JWA	Edward J. Comeau
WA1KYW	E.C. Hopkins
K1LEM	Gary E. Davis
K1LGM	Joseph Bedlovies
WA1LWD	Howard Hecht
K1MEA/4	James Wzorek
W1MHF	George Markland
WA1MNS	George Bisson
W1MRD	Robert Simons
WA1MTI	Anthony La Scalla
W1MX	M.I.T. Radio Society
K1NCI	Irving Knowles
WA1NDG	A.A.Alberti
WA1NJG	Max J. Fuchs
WA1NNW	Ed Storer
WA1NYV	William Smith
WA1NXR	Constance E. Owens
W1ODI	Lorin White
K1OKW	Romeo Allard
W1PBT	Joseph Backard
W1PFA	William Loeffler
WA1PSI	James Pickard
K1PWD	A.W. Holland
W1QB	Jerome Knowles
WA1QKS	Kent T. Luther
WA1RQJ	Ernest Lopez
K1SCQ	R. McClintock
W1SE	Earl Holbrook
W1SIP	John L. Brian
W1SR	George Wood
K1TCG/2	Julius Jones
W1THT	A. Tomkinson
W1VKF	Kenneth Roberts
W1VRK	Eugene Hastings
W1VRN	Forrest Hill
K1VRT	D.N. Lizee
K1VTE	A. Tamosaitis
K1WPS	Morris Bilgen
W1YIX	Peter Donneau
W2AAF	John Pomfret
WA2AEJ	Ray Rosenzweig
WA2AMU	Jim Glennon
K2APZ	Brooklyn College Amateur Radio Soc.
WB2AQC	George Pataki
W2BCS	George Downing
W2BKU	Samuel Laine
WA2BLC	Richard Forscy
K2BPF	George Woolley
WA2BTG	William Sutter
K2BZ	James M. Bruning
WB2CAD	Sanford Deutsch
W2CHM	Ross Macaluso
WA2CPK	Jefferson Bronfeld
WA2CSJ	Julian Scavetta
K2CYQ	Lloyd Fallowes
W2DD	William DeWitt
WB2DHL	Robert Hanson
WB2DLF	L.J. Milcarek
WB2DRS	Frank Modico
WB2DRW	John Zapisek
W2ELF	Walt Bieda
WA2EWO	David Patterson
WA2EXZ	Robert Ross
W2FJT	Ed Sommerfield
W2FLL	Marvin Chakin
W2FOW	William Carter
W2FWZ	Walter Grumbacher
K2FX	Durwood-Dee-Finch
WN2GDT	Anthony P. Ambrosecchio
W2GGU	Donald LeFevre
W2GN	Fred Merry
W2GND	Harry Harchar
W2GNU	Leo Moses
WA2GOI	Robert Stelmock
W2GRD	Mark Busch
WB2GRF	W.F. Schmidt
WB2GWU	Walter G. Hawrysko
W2HF	Herb Brown
W2HOD	Vince Piermattie
W2HPN	R. Evans
WB2HSH	Daniel Girard
WA2HUJ	Walt Bieda, Jr.
WA2HZI	Kenneth King
WA2IAC	Greg Squires
K2IRK	R.P. Loutzker
WA2ITK	Paul S. Adler
W2IUY	Leiper Read
WA2IUZ	E. Chaffee
W2JVO	George Smith
K2JLL	Michael Kloch
WA2JOW	John Jamele
W2JTT	Ben Kleinerman
W2KCM	H. Harvey
K2KEY	Melvin Schneider
WA2KOU	Cris Boniakowski
WA2KVM	Earle Arundel
W2KVP	Raymond Demers
W2KXL	Jerome Fischer
WB2LFV	William Gilroy
WB2LFW	Banks Moore
WA2LKC	Helena D'avino
WA2LLG	Leonard Battista
W2LNI	Barry Gensler
K2LOI	Charles Schaffer
WB2LRK	Carmen D'avino

K2LTE	Elwood Stroud
WB2LUM	Robert Fine
W2MCY	F. Tracy
WB2MEX	Rocco J. Grillo
WB2MIC	Joseph Boniakowski
WA2MID	Marshall Jones
W2MJK	William Hathaway
WA2MQT	Barry Burns
WA2MSF	Ken Countess
WB2NDH	Will Willemse
W2NOL	Byron Berg
W2NSD/1	Wayne Green
W2NVZ	Robert Erskine
WA2OHM	Martin Rigberg
K2OJL	Jim Zimskind
K2OMC	J.S. Badami
K2ONE	Vincent Dalli
WB2OOC	Ira J. Rampil
WA2ORV	Mark Dulcey
K2OSP	Frank E. Conti
WB2OWX	W.J. Giesser
K2PBF	George Wooley
K2PEJ	Stephen Berman
W2PH	Joseph J. Anlage
W2PMV	Lewis West
W2PQC	George Murillo
W2PVF	J. Hayward
WB2QEV	Donald Schichler
K2QGZ	Joseph Quickel
WB2QQQ	William Bounds
WA2QZP	Joseph Karatka
WA2RAZ	Steven Shapiro
WB2RLO	Fairlawn AM Radio Club
K2RLW	Robert K. Curtis
W2RQF	Benjamin Frommer
W2RTC	Lawrence Reisch
W2SHU	Ampless Fagans
K2SHU	Sherman Leifer
W2SJH	Durwood Finch
WA2SMW	Jack Bronfeld
W2SZF	P.J. Andrews
K2TCO	R. Haycook
W2TFV	D.R. Henderson
WB2TI	R. McElroy
WB2INC/3	William Webster
WN2TSL	K.W. Jarvis
W2TFV	David Henderson
WB2TIY	R. McElroy
K2TKE	Ward Melville Hs Arc
WB2TNC/3	William Webster, Jr.
WA2TOO	J.W. Natusch
K2ULR	R.C. Sills
W2UN	Edson Snow
WA2VEG	Russel Hobert
W2VKD	Ed Donnellan
WA2VTR	Vilardi
W2WHK	Donald Fuller
WA2WKH	Allen Roth
WB2WZG	Gary Sienxiewicz
WA2YFB	Cedric Myers
WB2YKL	Gary J. Carroll
WA2YVK	Francis Fallon
W2YYW	P. Evans
W2ZDP	Andrew Dachnowicz
WB2ZEA	David Hallidy
WB2ZSY	Anthony J. Vella
K3AFK	John Smith
WA3ATP	Benjamin Schaefer
W3ATV	Robert McMillen
W3AVJ	David Zweier
K3BYA	Kern M. Bowyer
W3BYQ	Delbert Ping
W3CBV	Frederick Hamburger
K3DEA	William Losey
W3DID	Lawrence Shelton
W3DXP	Charles Ruling
W3EFG	Robert Stone
K3EGK	John Kurtinecz
W3EMH	William Frisbie
WA3EQJ	Donald F. Rehrer
W3FAK	Francis Duffy
WA3FIK	Edward G. Titterton
W3FTL	Bob Davidheiser
WA3FTS	Jack Stoner
K3GZE	F.A. Majda
W3HEL	Frank Giordano
K3HLH	William Freeman
W3IE	Wilbur Rimer
WA3ILW	James McFadden
W3IRL	A.H. Jones
W3IPX	J.P. Weaver
K3JGI	Anthony D'Alonzo
W3JJU	John Hollar
W3JQ	Sidney S. Thomas
W3KAU	Raymond Rosenberg
W3KBA	Arthur Calvert
K3KGB	L.R. Cohen
WA3KIR	Donald Quint
WA3KMA	William Weaver
WA3KQD	George Dickson
WA3KOM	Robert O. Cherney
W3KRR	J. Allen Dewald
WA3LDD	Ray Fish
WA3LEU	Joseph Smotryski
WA3LJM	Jesse Marino
K3LNE	Siegbert Busch
W3LQS	Gerhard Wegener
K3LSX	John Talipsky
W3LXY	Joseph Yutz
W3LY	Edward Arvonio
W3MFT	Stanley Yutz
W3MHD	Frank Gibson
W3MSN	Lawrence Briggs
K3NEF	B.L. Blake, Jr.
W3NIG	Andrew L. Rossanese
WA3OHG	Harold Corbin
W3OPY	Albert Bulmer
WA3QEZ	Robert Rauch
WA3RIN	Kenneth G. Poore
W3RLR	Joseph Mullan
K3SLJ	John Smetona
W3SOB	R.R. Sutter
W3TE	David White
WA3TFS	James J. Forkin
WA3VHB	L.A. Iannone
WA3VRR	Paul Schwartz
WA3VUW	Robert A. Skipper
W3WIP	Walter Gervel
W3WLO/ VO1	A. Crisson
K3YHR	John R. Low
WA3YPI	Richard S. Wilson
WA4AEZ	C.W. Engel
WB4AGD	Worth Gruelle
W4AOK	Bradley Overton
W4API	Charles Spitz
WB4ASV	Ron Forbis
WA4ATD	Lynn Tichenor
WA4AYH	Washington Patrick
WA4BDZ	James Davis
W4BEJ	William Grieb
K4BG	Vern Wintermute
W4BNE	Ray Murphy
K4BOK	Dwight Elliott
K4BQ	William Dickson
W4BZW	Dick A. Mullikin
W4CCC	Henry Pfister
WB4CCZ	David Wood

W4CJV	Robert Hoover
K4CNP	L. Butsch
W4CVS	William Wells
WB4DBB	Herman Cone
W4DFW	Robert Patton
W4DIV	R.M. Cilvik
WN4DJC	Andrew C. Thigpen
K4DP	George W. Fahrubel
W4DWN	Walter D. Dixon, Jr.
WA4DWN	Donald A. Flenner
WB4ECE	Paul J. Furman
WA4EEZ	C. Engel
W4ELV	Frank Contorno
WB4EMF	Tim A. Siler
WA4ENJ	Ted Pounders
K4FCK	Donald J. McGurrin
WB4FCP	Truman Sims
K4FFW	James Berry
W4FMN	K. Bailey
K4FZ	Robert Weinig
K4GAR	Harrison Perl
K4GDN	Frederick N. Pessaro
W4GKF	C. Cone
K4GNG	Earl C. Tuttle
W4GUY	Charles Williams
K4GUY	Blair Barghausen
K4GWH	Richard Wood
K4GXO	Dr. Thomas W. Bradley
WB4HCV	James W. Thomas
WB4HDT	Prebon Lustrup
K4HFP	Thomas Kanode
K4HFZ	Thomas Traganza
W4MJQ	Thomas Moody
K4HKJ	Ben Shupack
K4HNN	Donald Osborne
WB4HNW	Walter Roetter
K4HPR	Jerome Fiore
WA4HXZ	J. Henry Felton
K4IBI	Chuck Warren
WB4IDW	Kenneth Napier
W4IET	Robert Street
WB4IFU	Tom Smith
K4ILC	Sam Hicks
WB4IOA	R.H. Uiterwyk
W4IPA	D.E. Phibbs
K4IPN	Joseph Sims
WA4IPQ	William Taylor
W4IQW	Lyman Menard
K4IRQ	Gary Elliott
WA4IXT	William Lambert
WB4JEV	John Sink, Jr.
W4JHM	Theodore Menten
K4JMH	E. Nannis
W4JNN	R. Arrowsmith
W4JOH	Raymond Cook
K4JPE	James Hicks
W4JPV	George S. Ramsey
WB4JUN	John Cunningham
WA4JWT	Ronald Oates
K4KAI	S. Yates
WA4KFI	C. Nobes
WB4KGW	Ronald Yarborough
W4KGR	J.R. Reagan
WB4KIF	Wenoca Amateur Radio Club
WB4KIT	J.S. Harvey
K4KIZ	Emory Jackson
WA4KKD	E.M. Sanders
WB4KUC	Kenneth Robinson
K4LAN	Louis M. Goldstein
W4LAS	Mabel Banks
W4LEK	Harry Ide
W4LKP	Craig Woodward
W4LOJ	James Thomas
W4LQI	J.C. Castle
W4LRG	William Bain
K4MEZ	C. Skidmore
W4MII	J. Everett Norfleet
W4MKT	Paul Robbins
K4ML	James Tucker
WA4MLR	Va. Comm. College
K4MPA	J. Smith
WA4MRQ	Craig Bradley
W4MS	Edward Collins
W4MSI	B. Ross
K4MVV	Joseph Rawley
WB4NKP/5	Niles S. Price
WB4NND	Don Ryan
WB4NXW	John Connolly
W4NUW	George Zarzour
WB4OBO	J.C. Johnson
WB4OEI	Charles Bible
W4OEK	Emery Flinn
WB4OJC	G.T. Bright
K4OQ	R.B. Conaughty
WA4OVS	Calvin LaBombard
WB4OVX	Jack Petree
WB4OXX	Herbert Connellan
WB4OZY	Richard Burleson
W4PAL	W.R. Smith
W4PBA	Kenneth Dowling
WB4PCL	O.L. Pellerin
WB4PCZ	F.A. Rech
W4PGK	Asa Tift
K4PGM	R.P. Cobb
K4PL	Clarence P. Bowyer
WB4PPW	Jesse Knight
K4PRT	Bernard Harris
WB4PSM	Alan Sims
WB4PWR	Alvaro Gonzalez
W4PXM	W.M. McDonald
K4QDN	John Curry
W4QFY	D.W. Cronin
K4QGV	Arthur Jones
K4QPR	Judge Bodycote
K4QX	David Guthrie
W4RAB	Maynard Cummings
WB4RHH	Ches Watkins
WB4RJG	David Rotenberry
WB4RKU	Robert Patton, Jr.
W4RL	Richard Peck
K4RQX	Howard Robinson
K4RSH	William Blair
WB4RXY	Tom O. Moore, III
WB4SCX	Harry Gressman
WB4SFK	Tom O. Moore
K4SLX	Arthur H. Driggers
W4SMT	W.J. Fleming
W4SYP	Albert Skievaski
WB4SZC	Robert Lee
WA4TAI	A. Whorton
W4TB	Nicholas Starvrou
K4TGC	James Young
WB4TLG/8	V.L. Stoner
K4TMA	Bernard Staub
W4TMR	Charlie Kluttz, Jr.
W4TOD	David Hall
WB4TOM	E.J. Willoughby
WB4TRJ	Art Ustal
WA4TST	Jerry Allnock
W4TSU	Earl Drew
K4TWJ	David Ingram
K4UMD	James Bonner
W4UMF	Theodore Cohen
W4UQH	C.R. Simpson
WB4UWE	Floyd Forrest
K4VBU	Lynwood Judkins
W4VBZ	W.R. Borger
K4VGN	Robert Sloat
W4VMO	Charles Perkins

WA4VPU	Claud Kelley
W4WIZ	Alvin W. Purser
W4WJJ	Everett E. Worrell, Sr.
W4WLY	Roy S. Lewis
K4YAQ	Paul Rodbell
WB4YDX	Michael Wheeler
W4YGM	James Hull
WB4YHM	E. Link
W4YHC	Robert Taylor
W4YK	Jay David
K4YPX	James Bland
WA4YRG	Emily Vaughn
WA4YVQ	Stephen Rock
K4YZD	Billy Waters
W4ZAA	Wendell H. Rushton
W4ZEZ	James Wilkie
K4ZNW	Joe Edwards
WA4ZOK	Thomas L. Smith
W4ZS	Basil McGinty
WA4ZVK	Joel Alexander

WB5ALN	Richard K. Reeder
K5ASK	L.R. Mitchell
WB5AUF	Walter Crook
K5AWR	John Clardy
WA5BOP	Tommy Lloyd
WB5BXD	Dick Dillard, Jr.
W5CKJ	Leonard Root
WA5CBQ	Ron Breland
WB5CNX	L. Williams
WB5CQO	Paul Basore
K5CSJ	W. Bringier
W5DFC	R.W. Engelhardt
WB5DTW	W.A. Gafford
W5DUU	David Hunter
K5DZF	J. Kirkham
K5EFB	Ray Davis
W5EHR	N.P. Jessup
W5EIO	K.M. Jessup
W5EOO	Vernon Dillaplain
WB5ESO	Robert Cox
W5EXG	Ted Quan
W5FGT	Karem Soule
WA5FMF	A.J. Dubuisson
WA5FZJ	Michael Palmer
K5GHV	R. Mager
W5GLD	Frank B. Wood
W5GQV	Leroy Clough
K5GSF	Leo Foehner
K5HVW	Harry Pennington
WA5IEV	Louis Levy
K5IHU	Robert Jett
WB5IOQ	Ron Greenwood
K5IRO	Benjamin Allen
WA5ITX	John Ward
K5IX	Hans Glitsch
WB5IXK	Bob King
WA5JJB	Kenneth Naizer
K5JKP	Barry Van Treese
W5JTA	Len Hoops
K5JXH	Bob Walker
WB5KJD	Charles P. Chilton
WA5KJT	Ollie Warren
W5KKY	John Sullivan
W5KPJ	Johny Joiner
WB5KTH	Charles Perring
WA5LKB	R.D. Spencer
K5LUW	L. Agard
W5MHV	Gerold McReynolds
K5MVD	Ben B. Manuel
K5MVP/8	Andres Calandria
WB5MVR	William Herbert
WA5MVU	Emilio Rivera
W5MWO	Jimmie Kepler
W5MY	George Bean
WA5NGR	S. Hunnicutt
W5NOO	Ramon Glidden
WA5NOO	Roger Kroning
W5NSF	Louis Brown
W5OOA	William Jepsen
WA5PDX	Caddo-Bossier CDA
W5PK	Herman Frazier
W5PKA	V.E. Bob Smith
W5PPP	Thomas Eanes
WA5QAP	James Beeson
W5QKR	Meredith Young
WA5QVD	W. Spenn
WA5RAS	Mac Vincent
WA5RHM	G. Bruce Schulz
W5RHP	R.E. Fix
WA5ROA	William Monning
W5RPH	Roemer Best
K5RSG	Eugene Tilton
K5RTI	Stanley Rosenquest
WA5SCP	Bob Ter Maat
W5SE	Jesse L. Miller
W6TKS	G.H. Liebmann
W5TOO	Ed Juge
W5TXK	Margret Brown
W5UCO	Eddie Reynolds
W5UR	Willie Petty
W5URN	Dusty Rhoades
WA5VJF	Ed Henderson
K5WIQ	J.L. Doerrie
WA5YAS	Karl Brownstein
W5YCB	Berkeley Davis
WA5YPB	Kenneth Purvis
W5ZTN	B.L. Basore
W5ZYO	E. Graham

W6ABP	M. Selwyn
WB6AMI	William Stevens
WB6AMT	Earl Lizardi
WB6ANA	Giles Barton
WA6AXE/ KG6	J.A. Glockner
W6AXH	F.J. Stein
K6BAZ	Warren Douglass
WA6BLJ	Shirley Lee

W6BQK	T. Nishiyama
W6BUA	Guido Pedretti
WA6BZF	Dick Keenan
W6BZS	Walter M. Smith
WB6CDU	Dennis Benischer
WB6CIA	Mark Schaefer
K6CRX	Frank Holly
W6CTH	Larry Reed
W6DCP	Gordon Felder
KB6DE	Joe Wheeler
WN6DEP	Jerry Slater
WA6DHM	Stanley Jaffe
K6DM	W.R. Larson
WB6DPO	Don Grant
K6DTX	David Shaver
W6DWK	Harvey Haack
WA6DWO	Phillip Richardson
WB6DXU	Nick Winter
K6DYX	William Smith
W6EMP	V. Schumacher
WA6ETL	Frank Koezian
WA6EWO	Gene Strohallen
WB6EXD	D. Derrick
WA6EYU	Andrew Ranhosky
W6EYY	Hal Godfrey
WB6FPE/5	Edwin Schaff
W6FPH	Bud Ballard
WB6FPJ	J.C. Gilliam
WA6FPM	James Hester
WA6FXM	M.H. Witmer

WB6GBX	R.C. Morrill
W6HAG	John Alten
W6HFU	Dick Rehling
WA6HNS	J.C. Pinkel
W6HTH/HL9WI	William Boykin
W6HWI	Ronald Akeps
WB6HWY	P. Young
W6IFL	Peter Trapolino
K6IIS	John K. Wood
WB6ISL	William Kimmel
K6IV	Clarence Munsey
W6IZJ	Edward Phillips
WB6JJE	John Zitelberger
WB6JJN	Arthur Clark
WB6JKW	Ralph Van Jindelt
W6JOT	Rick Craig
K6JOY	Phil Jensen
WA6JPL	Randy Chesnutt
WB6JQC	Joe Cardoza
WA6KJU	David Lackey
K6KOI	John Hecht
W6KQS	Melvin Walton
W6KPR	Stan Kellogg
K6KRZ	Robert Rose
K6KSY	Mel Hughes
W6KZL	Glen Tillack
WB6LEN	Mervyn Hecht
WA6LKD	William F. Wells
WA6LML	R.C. Mills
WA6LOF	Skip Quigley
K6LOM	Ed Jay
W6LPO	Grover Frater
WA6LQL	Fred Muller
W6LQO	Bob Hutchison
WA6LRA	D.A. Taylor
WB6LXF	Eugene Plummer
WB6LXS	Paul Steen
W6MAV	Donald Schliesser
W6LXV	Charles May
WB6MCW	Carlos Lemmi
WA6MEI	Bill Mitchell
W6MFS	Albert D. Devore
W6MNN	Lee Neeley
W6MUX	Lee Cohen
WB6MXR	R. Melville
W6MXV	Michael Tallent
WA6NNC/KH6	Robert Rivera
WB6OFX	Scott Medling
WB6OMF	Orestes Caballero
WA6OMT	Howard Ham
W6ONC	W.L. Ritzi
K6OPX	Barbara Clasen
WA6PFP	Robert Laszko
W6PLI	Paul Capetz
WB6PPI	Chester Hull
W6PQF	R.E. Guest
WA6PXC	Richard Spohn
W6PZE	Marvin Hansen
WA6QFU	Eugene E. Savelli
W6QGL	Robert Bignami
W6QGS	H.H. Parks
K6QL	David Fender
K6QPE	Ray N. Hauck
WB6QWC	Robert Taylor
WB6RDR	Dan Correia
WB6RGR	William Osler
W6RH	Ralph Heintz
WA6RNG	Byron Paul
W6ROS	R.A. White
W6RSZ	Paul Franusich
W6RTZ	Wilfred Neil
WB6RWI	Lenkurt Am. Radio Club
WA6RWL	L.L. Landers
W6SGD	Bob A. Leech
K6SMF	Neil Kaltman
WB6SMG	Victor Rose
WA6SQI	David Finley
K6STI	Brian Beezley
WA6SVT	M. Collis
WA6SXU	B.M. Williams
WA6SXV	Neal Hatcher
WA6TAX	J. McLeland
W6TCJ	Dave M. Smith
W6TCQ	R.F. Huntington
W6TEZ	William C. Arrasmith
W6THR	William Clasen
WB6TOC	Peter Kuehn
K6TRT	John R. Durham
K6TXW	R.L. Wallstrom
WB6UCC	M. Lourenco
W6UF	Bill Eitel
WB6ULR/6	Joe Simpkins
K6UMX	Louis Johnson
WA6UOU	Paul Babcock
K6UV	Francis Bernardini
WB6UYQ	Alan Frisbie
W6VLH	Melville Shavelson
WB6VPC	Martin Forrest
W6VUZ	Forrest Compton
W6WCH	Newton Butler
W6WMI	Lindsay Winkler
W6WVE	Wendell Larson
WA6WVX	R. Earl
WA6WWJ	Wayne Fitzer
WB6YCL	H. Fredericks
W6YFT	Dale Hauck
K6ZAJ	Wilbur White
W6ZC	Robert Warren
WB6ZFT	Dave Smith
K6ZP	Grover Frater
W6ZUM	Bill Brown
WB6ZYE	Thomas Pollock
K7ABW	J.A. Morgan
W7ABW	William Briles
WA7BAY	Michael Schone
WA7CNP	Rick Olsen
W7CRH	Frank Killinger
WA7CYC	F.J. Wilcox, Jr.
W7DDQ	Ernest Blind
W7DND	Tom Erdmann
W7DOZ	William Franklin
WA7DPO/9	Thomas King
W7DPW	David Drew
W7EAS	Richard Mussen
WA7EMH	William Borden
K7ENE	Ron Moss
W7EQX	E. Koch
W7EU	E.N. Greene
W7FEN	Robert Gervenack
K7GGD	R.A. Schaak
W7GGN	Charles Rissberger
W7GNF	R.E. Miller
W7IBL	Duane O. Howe
W7IYG	Bernard Harris
W7JIH	R.W. Kemp
W7JOE	Jack Tempest
WA7JIO	John B. Prigg, Sr.
WA7KLU	Robert Best
W7KPA	John Storie
W7KSG	J. Allen Call
W7LLP	Walter Crook
WA7LOV	Cyril Wolff
WA7LQO	Charles Hill
WA7MHP	Jeffrey A. Freedman
W7MKS	D. Mayes
K7MNZ	D. N. Monsen
WA7MOV	Robert Schloeman

ROBOT MODEL 300 SSTV SCAN CONVERTER

- SLOW SCAN PICTURE DISPLAY ON STANDARD TV MONITOR.
- STOP ACTION FRAME SNATCH FROM STANDARD TV CAMERA.
- 128 OR 256 LINE PICTURE SELECTABLE FROM FRONT PANEL.
- TV RECEIVER USED BOTH AS VIEWFINDER AND RECEIVING DISPLAY.
- 2, 4, 8.5, 17, 34 SECOND FRAME TIMES.
- USES STANDARD TV CAMERA AND MONITOR WITH NO MODIFICATION.
- AUTOMATIC OR MANUAL TV FRAME SNATCH.
- FM DEVIATION AND TUNING INDICATORS.
- HOLD CONTROL ENABLES RECEIVED PICTURE TO BE VIEWED FOR EXTENDED TIME.
- VIDEO OR RF OUTPUTS TO TV RECEIVER.
- PHONE LINE INPUT AND OUTPUT.

The ROBOT Model 300 SSTV Scan Converter receives, demodulates, stores and converts to standard fast-scan TV format pictures transmitted in accordance with accepted slow scan TV standards. The Model 300 also accepts standard fast-scan TV video signals and stores and converts them to accepted slow scan TV format for transmission.

In both cases, the accepted slow scan TV (SSTV) format can be transmitted and received over any voice-grade communication channel, including radio or telephone. The accepted SSTV format consists of audio FM modulation in the range from 1200 Hertz to 2300 Hertz.

The fast-scan output of the Robot Model 300 Scan Converter is standard TV video or RF capable of being displayed on any TV monitor or home TV set. The fast-scan input to the Model 300 is standard TV video produced by a TV camera or other video source.

The slow scan TV (SSTV) output of the ROBOT Model 300 Scan Converter is 2 volts (max.) peak-to-peak into a 1K load impedance. Modulation is FM (1200 to 2300 Hertz) and the signal can be recorded on any audio reel or cassette tape recorder. SSTV input to the Model 300 may range from 20 millivolts to 1 volt peak-to-peak. Input impedance is 10K.

The ROBOT Model 300 Scan Converter can b placed in either a 128-line or 256-line picture mode When sending pictures, the number of scan lines i each frame can be selected to be 32, 64, 128 or 25 (256 line mode only). When receiving pictures, th number of scan lines in each frame is determined b the transmitting station's frame-retrace signal. Th two modes and four line-numbers result in th following frame times:

SSTV Frame Times (Seconds)

number of Scan Lines	128-line Mode	256-Lin Mod
32	2.1	4.
64	4.3	8.
128	8.5	17
256	---	34

Full-frame format is square. Partial frame operation corresponds to the top ¼ or ½ of the picture (128-line) and the top 1/8, 1/4 or 1/2 of the picture (256-line).

When sending, tape-recording or preparing to send SSTV pictures, the ROBOT Model 300 Scan Converter snatches and stores one standard fast-scan TV field (1/60 second) from the TV camera or other video source. This may be automatic, In which case frame-snatch occurs at the beginning of each SSTV frame. Or it may be manual, in which a TV field is snatched whenever the operator presses a button. Provision is made so the frame-snatch button may be placed on a plug-in extension cord (not provided).

ROBOT RESEARCH, INC.
7591 CONVOY COURT, SAN DIEGO,CA 92111
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ROBOT MODEL 300 SSTV SCAN CONVERTER

SPECIFICATIONS

INPUT

Video Input - Standard 525-line TV video signal (625-line in 50 Hertz countries). 1.0 volt p-p white positive into 1K; BNC connector. Positive or random interlace.

SSTV Input - Accepts SSTV signal amplitudes from 20 millivolts to 1 volt. Minimum signal-to-noise ratio for clear pictures is 6 db. Input impedance 10K. Modulation standards are: white - 2300 Hz, black - 1500 Hz, sync - 1200 Hz. Sync standards are: horizontal - 6 m s, vertical - 66 m s.

OUTPUT

Video Output - Standard TV Video signal 1.4 volt p-p white positive into 75 ohms, BNC connector (cable supplied). Special format scan interlaced 2:1 compatible with standard 525 line TV receiver (625 lines in 50 Hertz countries). Alternate RF TV output may be received on channel 3 or 4.

SSTV Output - Accepted SSTV modulation 1200 Hz to 2300 Hz audio FM, 2 volts p-p (max.) into 1K load. Horizontal sync 6 m s, vertical retrace 66 m s. Line rate 15 Hz (128-line mode) or 7.5 Hz (256-line mode) in 60 Hertz countries; 16⅔ or 8⅓ in 50 Hertz countries.

CONTROLS, CONNECTORS AND INDICATORS

Front Panel Transmitter Controls - FM Deviation - two controls (**Span** and **Balance**) set degree of FM swing (**Span**) and center value (**Balance**) of SSTV signal generated from stored picture. **FM Limits** - two indicator lights (**White** and **Black**) indicate when video modulation goes beyond levels corresponding to SSTV Audio FM limits of 2300 Hz (**White**) and 1500 Hz (**Black**). **Snatch** - two controls (**Span** and **Balance**) set degree of modulation (**Span**) and central value (**Balance**) of recorded picture snatched from TV camera or other video source. **Scan Lines** selector switch (32, 64, 128, 256) selects number of lines in transmitted SSTV picture (see table: SSTV Frame Times). **Picture** toggle switch selects **Normal** or **Inverted** (black/white) transmitted picture. **Display** toggle switch selects video source for TV monitor from either TV camera (**Camera**) or stored picture (**Converter**). **Snatch** toggle switch selects either **Manual** or **Auto** control of TV frame snatch timing (in **Auto** at the beginning of each SSTV frame; in **Manual** whenever **Snatch Reset** push-button is actuated).

Front Panel Receiving Controls - Frame Duration selector switch sets either 15 Hz SSTV line rate (8.5 seconds full SSTV frame) or 7.5 Hz SSTV line rate (34 seconds full SSTV frame). **Power** indicator indicates **Power** switch is **on**; **Tuning** indicator blinks on 1200 ± 80 Hz horizontal sync pulses at 15 Hz or 7.5 Hz line rate. **Video Select** switch selects sources of SSTV: **Camera** (scan-converted snatched TV picture), **Receiver** (radio receiver) or **Tape** (audio reel or cassette tape recorder). Note: Any SSTV signals on PHONE input jack (rear panel) are present in all three selector switch positions. **Hor Hold** control adjusts for variations in received SSTV line rates from 12 HZ to 18 HZ (15 Hz nominal) and from 6 Hz to 9 Hz (7.5 Hz nominal). In 50 Hz countries, 16 2/3 Hz and 8 1/3 Hz are standard. **Receiver** - two controls (**Span** and **Balance**) set depth of modulation (**Span**) and central value (**Balance**) for storage of incoming SSTV picture; displayed on the external TV monitor. **Transmit** toggle switch selects between **Video** (SSTV) and **Voice** signals applied to the **Transmitter** jack on rear panel. **Receive** toggle switch selects continuous up-dating of stored and displayed SSTV picture (**Continue**) or holding of picture currently being received following end of current SSTV frame (**Hold**).

Rear Panel Connectors and Controls - Breaker is push-to-reset circuit breaker. **From Tape** and **to tape** provide for connections to and from audio reel or cassette tape recorder. **Receiver** jack receives SSTV signals from speaker output of radio receiver. **Telephone** jack sends or receives SSTV signals to or from telephone line. **Transmitter** jack sends SSTV signals to microphone input of radio transmitter. **Microphone** jack provides receptacle for radio station microphone (SSTV or voice selected by front-panel switch). **Display** BNC connector provides TV video or RF output to TV monitor or home TV set; **RF - Video** switch selects between modes. **Camera** BNC connector accepts TV video from TV camera or other standard video source. **Snatch** socket provides for operating front panel **Snatch** push button switch on the end of an extension cord (not supplied). **Selective Erase** connector permits external signal to selectively erase storage tube.

OTHER CHARACTERISTICS

Power Input - Line voltage range is 105 to 125 volts AC or 210 to 250 volts AC (specify), and 50 or 60 Hz (specify). Power consumption is 25 watts.

Mechanical - Width: 15¼ in.; Depth: 12½ in.; Height: 7 ¾ in.; Weight: 16 pounds (shipping weight: 20 pounds).

Construction - All solid state circuits on three glass epoxy printed circuit boards. Two-tone grey all-aluminum cabinet. Component complement: 69 transistors, 41 IC's, 41 diodes and 1 tube (silicon target storage tube).

PRICE

Model 300 Scan Converter	$995
RCA Model TC-1000 TV Camera	$260
Setchell-Carlson #10M915 CCTV Monitor	$225

WA7MPI	Charles Olson
WA7MQO	William Blomgren
K7NEQ	Donald Birch
WA7NFE	Donald Peter
WA7NIN	Patrick Bacon
W7NQI	Rollie Emerson
W7NVB	Darrell Langston
WA7OUD	Roy Mosley
W7OZH	Lawrence Schumacher
WA7PGW	Robert Ely
WA7PMN	Donald Lievan
K7PVZ	R.D. Lindecranz
W7QA	W.P. Gilbert
WA7QBV	Robert Howell
W7QO	Carl Chaplin
W7RDR	L. Clark
WA7RYD	Norman D. Ribail
W7SAB	Glen Ritchey
WA7SDS	Howard Wood
K7SBK	Al Gerbens
WA7SFY	Richard Dillard
W7SJR	Doug Slagle
WA7TBB	L.M. Eggert
K7UGA	Barry Goldwater
WA7UGA	Bash Hai Ne Ae Arc
K7VAT	G.N. Gompf
K7VJH	Albert Devore
W7VEW	Edward Kimber
W7VK	Gordon K. Woods
K7VNO	Ralph Wheaton
W7WDZ	Ralph Gasparotti
WA7WOC	Donald Lehto
K7YXP	Louis Daugherty
W7YZZ	James Wilkinson
K7YZZ	Louis Hutton
K7ZDH	F. Hegewald
W7ZTI	John Sabourin
W8ABB	Fred Voltmer
W8AFW	Stanley Miller
W8AHZ	West Virginia Inst. of Tech.
WB8AKU	John Gallucci
WB8AKU	John Gallucci
WA8ASV	Charles Secrest
W8ATK	L.W. Reinhart
WA8AYX	Christopher Brinkley
WB8BHE	T.J. Engardio
WB8BPK	Dean Seeger
K8BSM	Jack Sargent
W8BT	Albert Hix
WB8CBM	Stan Michalek
K8CBN	Dennis Scott
W8CEM	Charles Perry
WB8CFM	N.R. Popovich
WB8CGY	John Greene
W8CH	Joe Smith
W8CIV	C. Thrasher
WB8CLG	Margaret Noblet
W8CLN	Charles Seelig
W8CVS	Joseph Bandy
W8CWN	Richard Crane
K8DAJ	Maury Tepper
WB8DDI	Bob Wehking
W8DPW	R.F. Zimmerman
W8DQL	Leonard Nathanson
WB8DQT	Ralph Taggart
W8DSY	Lester Nafzger
W8DOW	G.A. Priestley
K8DTQ	A. Lemke
W8DU	Ed McKenzie
W8DX	Richard Cotton
W8ECD	Larry Rice
W8EUT	William McEwen
W8FOI	V. Beck
W8FPM	Hugh K. Cotton
W8FPZ	Art Boltz
W8FRQ	William Ennis
W8FWP	Don Burns
K8GCS	Harry Covault
W8GSK	D. Domer
K8GRO	Chester Rataski
K8GVY	Jon Cverna
W8HQQ	Thomas Talley
WB8HRO	T. Conroy
WA8ICQ	Larry Knox
WA8IHZ	Robert E. Lee
W8IQT	George Kincade
W8IWL	Alfred Phillips
WB8JEY	Robert L. Scott
W8JHL	Gwynn Thomas
WB8JOS	B.L. Campbell
W8JQ	C. Richardson
W8JRZ	Paul Schmidt
W8KBI	Keith O'Connor
WA8KBL	Paul Lange
K8KXK	D.J. Had
W8KXR	G.G. Beckwith
WB8LIT	Kenneth A. Ascher
W8LKF	James Miller
WA8LMF	Stephen Smith
WB8LQH	Eastern Mich. Univ. Arc.
W8LUI	Merle Lawrence
K8LUI	Robert Osborne
W8MDL	David L. Blosser
W8MTI	Harold Davis
W8MXJ	Henry Washington
K8MZS	Charles J. Rex
W8NKQ	Dencle Jenkins
K8NTE	Robert Pinder
W8OAX	E. Edge
W8OKB	P.S. Taylor
W8PEY/1	William Theeringer
WA8PFB	Edward D. Knight
WB8PTO	Verne L. Stoner
WB8RBO	Douglas Angerman
W8RC	Leonard Nathanson
W8RVU	Clancy Waller
K8SFF	Jerome Knight
W8SH	Michigan State University
W8SPM	H. Cotton
WA8SNR	Dick Garlock
WA8TEA	William Barte
W8TGL	M.W. Shroyer
W8UDN	Edward Kopp
W8UDP	Robert Leaf
WA8UIO	Dave McConnell
W8URX	Donald McClaren
WB8UTS	Vernon Crosier
W8UUS	Mel Marsley
W8UVO	W.E. McGran
WA8UWY	David Shirk
K8UZC	Robert Rose
WA8VFK	A.J. Parker
WA8VSJ	Arthur R. Lewis
WA8VUV	W.L. Taylor
W8VZM	Joseph Elliott
WA8VZO	Ray Sanders
WA8WBX	Glenn Lechner
WA8WDQ	Brad Noblet
W8WGP	Carlton Lemons
W8WHQ	R.L. Monroe
W8YEK	Eugene Kundert
WA8YFW	Richard Drain
W8YHQ	Neal Farrar
K8YJL	Donald Delozier
K8YVA	D.E. Cahur
WA8YWY	Thomas Manley
W8ZCV	Walter Burdine
WA8ZDT	N. Dunham
WA8ZIM	William Ungar
W8ZSX	R.J. Templin
K8ZTT	R. Williams

WA9AAV	Patrick Wagner
WB9AOU	David J. Nicolaus
W9BLU	Wayne Taber
WA9BNZ	Bill Pelton
WB9BQQ	J.J. Jordan, Jr.
K9BTU	Dick Kesler
WB9BXQ	Don B. Pili
WB9BXW	Charles McCollum
W9CBQ	R.E. Rufener
K9CDB	L. Gregg Steele
W9CJS	David Gauger
W9CKF	Porter Barnes
W9CQG	Gerald M. Bower
WB9CQX	Warren Boehm
W9CSG	O. Schoenrock
W9DG	William Moloney
W9DIU	P.H. Davis
WB9DRH	Tom Wrensch
K9DUF	Bill Belt
WB9EAQ	Max Wagoner
W9EWC	Herman Greve
W9FON	Bryan Davidson
WB9FYY	Forrest Koestge
W9GDS	Robert Walgreen
WA9GGU	Ted Boehm
W9GHD	G. McDaniel
WB9GIT	R.F. Sobol
W9HJV	Herman Ludvik
W9HTF	Bernard Ostrofsky
W9HR	Emmet Algiers
K9HTM	Jack Cutright
W9IBA	John Antalek
WB9ICD	M.J. Danek
W9ITI	T.W. Gleason
W9JCV	F.H. Calvert
WA9JDN	Donald Sang
WB9JFF	John Tewell, Jr.
W9JJL	Albert Stancel
WoJOO	Terry Long
W9JWK	Grant Bauch
W9KAS	Glenn Barr
K9KHW	Raymond Grenier
WA9KKU	Marvin Roesch
WB9KTL	Stephen Steinmetz
WB9KVA	L.H. Weaver
WB9KYQ	Arthur Blatter
W9LOJ	J. Cerny
K9LSB	J.D. Forbing
W9LUO	Robert Tschannen
WB9LUS	A. Harmon
W9LVH	Howie Huntington
W9LXH	Raymond Divis
WB9LZO	R.E. Harvey
W9MC	M. Bartlett
WA9MFF	Larry Pryor
WA9MFZ	G. Kopstein
WA9NHQ	William Gode
W9NTP	Don Miller
WA9OCO	George Vanada
WA9PAD	Michael Ford
K9PAJ	W. Wontrobe
WA9PDJ	Bernard Burke
W9PHK	Chester Minkowski
K9PLM	Edward Reinhart
WA9PWN	Fred M. Pfeiffer
WA9PZB	Ken Bussell
WN9QPG	David Filmer
WA9RHU	Ron Azarkiewics
W9RPN	Roland Brown
K9RSQ	Louis Vertcnik
WA9SLZ	Rev. Timothy Gericke
W9TDK	S.J. Shalett
K9TPC	Art Simpson
K9TYS	Marshall J. Snapp, Jr.
W9UGH	Wilmer Broadus
WA9UHV	Gordon Howlett
K9UIM	David Smith
WA9VLK	Vern Weiss
W9VZU	E. Hoff
W9WED	Buster Alongi
K9WWD	David J. Cooper
WA9YAB	Luther W. Newby
W9YDX	Roy Rusin
WA9YGS	Michael Ringeisen
WA9ZAK	Phil McMillan
W9ZFH	William Smith
WA9ZLP	Alexander Suritis
W0AAA	Harold Suman
W0ACT	W. Winchner
WA0AHX	Frank Meduna
W0AKT	R. Trowbridge
WB0ALI	Ronald Bobo
WN0AMD	Bob Henderson
W0ATR	S. Holisky
WA0AWH	Marvin Richardson
W0BYC	C.E. Courtney
W0CFN	Gordon Mycue
W0CIK	Gene Courtney
K0CRB	Richard Pollock
W0DEI	Francis Kramer
WB0DLC	Ron Meyer
W0DO	Lee Wiese
W0DRT	Allen Schulman
WB0DSA/7	John Kuschill
W0DUL	Frank Lombard
W0DZB	Robert LaRue
W0EGP	Frederick Fischer
WB0ELN	Robert A. Delaney
W0ERA	Floyd Timmons
W0EVX	Bernard Wagner
WB0FAB	Warren Taylor
W0FAP	Floyd Delon
W0FEE	Russel Taylor
WB0FHH	Bill Fitzpatrick
W0FMV/6	Marsh Parker
K0FVZ	Melvin Rensberger
K0GBC	Paul Wentzel
W0GEK	Frank Pelton
K0GNH	Justin Spinler
WB0GPC	Joe Walsch
W0GYM	Victor Clarence
W0HLE	Jack Eolow
W0IBZ	Melvon Hart
WB0ICP	Ron Richards
W0IXX	N. Frajola
W0IYW	H.M. Rosenberg
WA0JCE	Loren McGinnis
WB0JOJ	Robert Walton
W0JKV	Norris Sapp
WB0JON	H. Slotsve
W0KGI	Robert Wilson
W0KSD	J.P. Rybak
WA0KSS	Bell Arc
W0LB	Jay Hawk Ar Soc Inc
W0LLB	Tommy Hoke
W0LMD	Robert Suding
WA0LMK	L. Ullrich
W0LS	Myron Pogue
WA0LLQ	Jay McAleer
W0LXX	N.D. Frajola
W0MFQ	Thomas Brown
WB0MHY	John Kindschi
K0MST	Keith Schmidt
K0MVB	H.C. Borrmann
WB0NWU	William Bagby
WB0OAZ	L.A. Iannone, M.D.
W0OBI	Robert Snook

W0OQE	Matthew Walter
W0ORX	C. MacDonald
W0 PKA	Steve Keidl
WA0PJV	S. Anonsen
WA0PUJ	Glenn Johnson
WA0QIT	Leslie Taylor
W0QWH	Gerald Foster
K0RCZ	Thomas Spink
WA0RIM	John A. Taber
WA0RKU	Floyd Himmel
K0RZJ	William McCaa
WA0SMG	Mark Bunker
K0SVW	Stephen L. Towl
WA0TLT	James Moffat
WA0TOS	Thomas Scott
W0UKW	Santi Forti
WA0UKW	Michael Erickson
WA0UNA	Boyd Busse
W0VNP	Bert Martin
W0VUA	L. Steve Finnegan
WA0VZF	James Haynes
W0VZK	William Buckner
WA0 VZM	Merle Foley
K0WLT	Lavern Hansen
W0 YDM	Keith Farris
WA0 YFU	Gerald Fleck
WA0 YGP	Herbert Beach
K0 YKJ	S. Barnes
W0 YMG	Dennis Main
W0 YNM	Odell M. Sannes
WA0 YOB	Harold Steinhoff
W0ZB	Lester Benson
WA0 ZCW	M.W. Womble
W0ZWH	Lawrence W. Martin
WA6AXE/ KG6	J. Glockner
KG6JBR	Gary Cochrell
KG6JDB	John Snyder
Kh6BAS	Edward Williams
KH6BFF	Clarence Smith
KH6DEH	Henry Cremer
KH6DH	Walter Johnson
KH6GLU	Edward DeYoung
KH6HJF	Donald Muth
KH6IJ	E. Katashi Nose
KH6NR	Naval Reserve Training Ctr
KL7ALJ	Albert Stewart
KL7DRZ	John Terry
KL7FHN	Ralph Marsh
KL7HAB	David Lawrence
KL7HEE	Frederick Race

OUTSIDE U.S.A.

KA2AI	S.S. Yates
KA2DF	David M. Fox
KC4USX	D. Stahl
KC6AO	David Miller
KP4AHQ	Lois M. Rivera
KP4DQN	Pedro Gonzalez
KP4DRJ	Angel D. Barreto
KP4GN	Juan Ortiz
KV4BW	Athniel C. Ottley
KV4CM	F. Pelton
KV4FY	John Kinzer
KS6DW	M. Skowronski
KX6DB	Kwajalein Amateur Radio Club
KX6DR	Robert E. Ray, Jr.
KZ5CR	Chagres River Radio Club
KZ5MD	Erik Svenkerud
AP2AD	A. Ebrahim
CN8HD	F. Wiedemann
CP1FW	A.S. Landry
WA2ZDF/ CP1	Joseph Trombino
CR6CA	Joao Sacadura Cabral
CR6IS	Jose Esteves Farizo
CR6IV	Celse Rodrigues Faria
CR6QY	Edgar De Lima
CR6VQ	Francisco Silveira Ramos
CR6YS	Jesefa Cinos Rome Farize
CT1BT	Romuldo Teles
CT1EQ	Bernard J. Fielding
CT1LB	Tony Jongenelen
CT1LX	Joao Cerqueira
CT1PG	Guilherme Jorge Janz
CX2GB	R. Rivero
C31HD	Nik
DA1BR	J. Bryant
DJ1IJ	Johannes Chmielus
DJ3OE	Herbert Werry
DJ4SS	Dr. Siegfried Sprainys
DJ7UP	Guenter Michels
DJ9OV	Kurt Woehner
DJ9TT	Ulrich Merten
DJ0 CL	P. Scannapieco
DJ0 CN	Siegbert Busch
DJ0 KQ	A.B. Hubbs
DK1DW	Erich Driever
DK2RD	Joerg Michalski
DK2WY	Wolfgang Mocker
DK3ZF	Peter Rudolph
DK4XO	Siegfried Mueller
DK4ZW	Franz Sihorsch
DK5BW	Heinz Ihnken
DK5EL	Otto Schopen
DK5WG	Thommes Klaus
DK6JJ	Hans Albert Ulmer
DK6VK	Georg-Alfred Mettel
DK9QP	Hans H. Breede
DK9WB	Jakob Nikolai
DL2RZ	Volker Wraase
DL3BJ	Joseph Kruse
DL8HY	Dr. Fred Michalski
DL9MO	Horst Knoll
DU1FR	F. Ravina
DU1JMG	Jose Gonzalez
DU1SS	Edgardo Silverio
DU1ST	Edgar Silverio
EA4DT	Amador Alzueta
EA4KJ	Carlos Villaneuva
EA6AA	Xavier Sanso
EA8CI	Manuel Cabrera Rivero
EA8ID	O. Conradi
EL2CB	Lee Neeley
EP2FB	W. Frisbie
ET3DS	David Segal
ET3JH	Jay Hauger
ET3USE	J. Bernier
F2KC	C. Hurel
F2QD	Paul Doussaud
F2QX	Bernard Archard
F5DB	Bernard Desbiolles
F6AIK/W3	Basil Vitsaxis
F6AXT	Andre Balout
F6AZT	Paul Tatu
F6BDJ	Jean Nicolas
F6BIG	Jean P. Grillere
F6BOI	M. Alt
F9AC	Claude Andre
F9XY	Gilbert Derouineau
F0 AOY	Heinz Ihnken
F0 KK	G. Lowitz
FG7XT	Jean Wegimont
FL8BH	H. Bouchet
FM7WW	F. Alexandrine
FO8DO	Fernand Caumet

FP8DF	Pierre-Marie Cloony
G2JR	H.B. Burton
G3BIX	Jim Collings
G3BXI	J. Farlow
G3IAD	Neville Jackson
G3PKE	Ron Penn
G3RHI	B. Arnold
G3RTU	K. Kahn
G3VGU	J. Outen
G3VKV	Grahan Jones
G3VXO	B.J. Fielding
G3WGP	Gilwell Scout Am. Radio Group
G3WW	Richard Thurlow
G3ZAY	M. Atherton
G3ZGO	R. Skegg
G4CYZ	L.H.T. Large
G5ZT	Harold Jones
GI3ONF	Bob Sinton
G3RHI	B. Arnold
GC3YIZ	J. Martin
GI3MBB	Allen McMurtry
GI3WWY	Mervyn Anderson
GM3KJF	Jack Wilson
GM3WIL	David Cossar
GM4DAE	Wm. McMillan
GW3DZJ	F. Pardy
HA7LF	Radio Club
HB9ADQ	Willi Richantz
HB9AIP	M. Kohli
HB9ALB	Rico Koebeli
HB9ASI	Christian Lindenmaier
HB9AVK	Paul Kueng
HB9AWU	Hans Kappeli
HB9HK	Willy Rogg
HB9IT	P. Steuer
HB9NL	Franz Acklin
HB0NL	F. Acklin
HC1BU	Earll Findley
HE9FHE	Enrico Bardyguin
HI3ABB	Antonio Bojos
HK3CF	A. Zabala
HK5HK	Joseph Saouda
HK7XI	Hernando Vargas
HL9WI	W. Boykin
HM1IE	K.Y. Lee
HM1AQ	Park Sung-Kun
HP1MXU	Milton Yeager
HR2HH	Hal Holler
HS1AHE	D. Durel
HZ1SH	Faisal
I1AOH	Costantino Rallo
I1BAY	Attilio Sacco
I1BNT	Banito Bartolucci
I1CAM	Massimiliamo Calzolari
I1CG	Guiliano Carmignani
I1CGE	Alfio Polidoro
I1CSN	G. Cosmina
I1FMT	Fortunato Martina
I1GPG	Gian Piero Gaietta
I1KBW	Pierfelice Broda
I1KH!	Gloriano Rossi
I1LCF	Franco Fanti
I1LNU	Luciano Crespo
I1MY	Marciano Righini
I1PLR	Landuccio Pellegrini
I1RAR	Araldo Ramundo
I1ROL	Lamberto Rossi
I1RUB	Mario Rubino
I1SBF	Alberto Scarpelli
I2DBB	Bruno Del Barba
I2PET	Tarcisio Pietta
I2PHO	Walfredo Guazzagni
I3AOS	Fantoni Piero
I3CGV	Conte Dr. Giovanni
I2WIW	Maurizio F. Rossi
I3HDC	Francesco Di Crescenzo
I5CW	Mario Lucci
I6TCR	Franchino Della Frana
I8AAQ	Scafidi Clodohiro
I8CAQ	Alfonso Rosa
I8GMG	Nicola Bucci
I8MGQ	Medugno Giovanni
I8TUS	Salvatore Tucci
IS1GF	Giovanni Fara
IS1PEM	Efisio Marino Piras
IT9JOY	Ginlio Mangano
JA1BLU	J. Takahashi
JA1BOC/2	Shiroh Hagaoka
JA1COW	Masa Mori
JA1FF	Morio Kohda
JA1FS	S. Wada
JA2BL	Nab Hasegawa
JA2CNC	K. Onemoto
JA2DYL	Sige Hasegawa
JA2KB	I. Iino
JA3AER	Taizo Arakawa
JA3AIS	S. Kawada
JA3JEW	Hiraku Takehara
JA4MCK	Hideo Baba
JA5EUV	Masao Shimoyama
JA6DG	Kazuyuki Araki
JA7ARZ	Katsumi Fujita
JA7FS	K. Sasaki
JA0AXV	Shigeru Sugiyama
JF1CTE	Takashi Uno
JR6YAX	R. LaRue
JY8AA	W. Green
LA2BK	Johnny Bjornulf
LA3SG	Kjell Midtseter
LA4LN	Tom Victor Segalstad
LA5UB	Einar K. Grette
LU1ABY	Celso B. Fernandez
LU2DDI	Adolfo D'Onofrio
LU3ABI	Ivan Perez Del Cerro
LU4CG	Dr. Pablo Garcia Siguero
LU5AAG	Manuel L. Winer
LU5DEG	J.A. Lernoud
LU6EAM	Pedro Breuer Moreno
LU7AAG	Alberto Nabona
LU7DDG	Augusto Kovacci
LX1SK	Jean Mootz
OA1BU	W. Earle Findley
OA4F	A. Pereyra
OD5AM	Antoine Nader
OD5BV	Stanley Khoury
OD5HC	P. Rizk
OE6GC	Harald Gosch
OE6WF	F. Watzl
OE9IM	Hugo Mathis
OH5RM	Jouko Nurma
OK1ACS	Vaclav Nekvasil
OK1AHH	Jarcslav Kysela
OK1AHM	Jaroslav Bunata
OK1AHV	Bedrich Noheyl
OK1AOE	Karel Fulin
OK1AVK	Karel Vlasak
OK1AVU	Jan Kandl
OK1BOM	Edvin Merta
OK1DAS	Vladimir Hejkal
OK1DHM	Jan Bunata
OK1GW	Antonin Glanc
OK1JMW	Josef Marik
OK1KD	Ivo Kolar
OK1KPU	Radio Club Teplicw
OK1NH	Jaroslav Presl
OK1OO	Frantisek Smola
OK1VHR	Frantisek Faltus
OK2BHW	Jiri Bandouch

OK2BIQ	Jan Motyka
OK2BMB	Antonin Hanak
OK2BNE	Tomas Bohacek
OK2PAD	Zdenek Habal
OK2PAF	Frantisek Matuska
OK2PBC	Vilem Horacek
OK2SLI	Miroslav Slimar
OK2SXX	Dobroslav Hruska
OK3CJA	Ivan Urda
OK3LF	Ferdinand Dirnbach
ON4BX	Arthur Blave
ON4DN	G. Detemmerman
ON4NE	Jean Dehon
ON4WW	Roger Henry
ON5IP	Philippe Dumont
ON5SV	Fernand Vidrequin
ON5SY	Herve Van Hauwaert
ON5TB	Trussart
ON8XA	Ake R. Jansson
OX3LP	P. Larsen
OX3SL	Sven Lindstrom
OY1M	Michael Arnskov
OZ1AT	Anders Anderson
OZ1ZS	Erik F. Hansen
OZ2LW	Leif Lundsk Jensen
OZ4EV	O.B. Petersen
OZ4IP	T. Pedersen
OZ5FG	H. Skov
OZ5JT	J.E. Thomsen
OZ5OF	Ole Flensborg
OZ6PH	C. Knudsen
OZ8BW	H. Lorentzen
OZ8FU	F.W. Larsen
OZ9ZR	SV AA Petersen
PA9ABQ	Heinz Ihnken
PA0DK	M. Ph. De Koster
PA0FAB	F.A. Bannink
PA0HTR	H.A. Kanon
PA0KB	J.K. Asselbergs
PA0LAM	A. Lambriex
PA0MAC	Max Horback
PJ2CU	J. Caljouw
PY1DCB	Paulo Paula Leite
PY2EEG	George Georgakopoulos
PY2WE	Iraci Ribeiro
PY3DI	Demetrio Mercio Xavier
PY6ADZ	Eduardo Valente
PY7BQZ	Antonio Lima
PZ1DA	W. Porter
P29MC	J.W. McCulloch
SM4AMM	S. Ramberg
SM5CLW	Lajos Nemeth
SM5DAJ	Sixten Ehnstrom
SM5RQ	Martin Persson
SM6CQV	Ingmar Lindstrom
SM6OH	Christian Lingen
SM7BGE	Egon Jonson
SM0BUO	Aka Backman
SM0EKG	Henning Edgren
SP9VU	L. Morcinek
SV1AB	George Venardakis
SV1CG	Kostas Tzetzairlides
K4PGM/T17	Ray Cobb
TJ1AX	J. Holen
TJ1BB	John Vosnakis
TR8WR	Bob Wegscheider
TU2DO	John Doerr
TU2BC	Joseph Derviso
UW6LC	Via Central Radio Club
VE1AHM	Gary Capson
VE1SI	T.W. Wilson
VE1UC	Oakley G. Peck
VE1WK	J.G. Perry
VE2AZQ	Jacques Ethier
VE2BVC	Paul St. Laurent
VE2BZ	Hubert Thibodeau
VE2DZ	Marcel Henry
VE2KQ	Lloyd Guenette
VE2WZ	Ron A. Fortin
VE3AHS	E. Dileo
VE3BKQ	E. Mohammed
VE3BNW	Willard Hendry
VE3BWA	Bill Argent
VE3BWD	J. Donato
VE3BZF	Lloyd Ferns
VE3CAQ	George Knight
VE3CEB	G. Lea
VE3CFR	Lloyd Wright
VE3CUB	David Best
VE3DQL	W.G. Spooner
VE3EZO	K. Olsen
VE3FSA	R. Pearson
VE3GFT	William Tilly
VE3GMT	Jack Reed
VE3HC	Fred Hammond
VE3LU	Clayt Anguish
VE3MJ	M.J. Wolfson
VE3MR	Martin Rosenthal
VE3OH	R. Walker
VE3OSC	Ontario Science Centre
VE3XD	W. McCleary
VE4AL	A.E. Duffield
VE4CG	Edward Walker
VE4HA	L. Hauck
VE6AG	Andrew Soloweyko
VE6AVK	Johannes Verkerk
VE6FL	Elmer Lane
VE6RM	Robert Moore
VE6SL	D.M. Farmer
VE6ZR	M. Marshall
VE7AIC	Norris Hyde
VE7AOK	G. Asche
VE7BFB	Rick Matthew
VE7BQF	Robert Earl
VE7FI	M. Bud Smith
VE7JA	N. Brittain
VK1IJC	J.J. Campbell
VK2BRA	D. Avery
VK2EC	E. Crouch
VK2GR/T	A.B. Mason
VK2RO	Roy Gray
VK2YU	Bruce Hall
VK3ABM	W. Porter
VK3ACS	K.C. Seddon
VK3AQL	K. Glover
VK3ARD	K. Connelly
VK3CR	R.J. Flanagan
VK3EG	E.H. Gray
VK3KW	Len White
VK3LM/T	J. Wilson
VK3OW	I. Tarbit
VK3PB	D. Kenner
VK3TE	L. Dixon
VK3YEO	A. McKibbin
VK4NP	N. Wilson
VK4XV	F.R. Campbell
VK5BS	B.S. Clark
VK5MF	A. Smythe
VK5MK	R. Brown
VK6CS	C. Sangster
VK6ES/T	E. Samek
VK6MF	N. Mellows
VK6NS	N. Schroeder
VK7JV	J. Van Staveren
VK8CW	C. Williams
VK8KK	D.A. McArthur
VK9XX	A. Kershaw
VO1BL	C. Engelbrecht

VO1WLO	Alfred Crisson
VP2AR	C. Matthew
VP2ME	Ray Rosenberg
VP7BC	Ed Link
K46XO/ VP7	T. Bradley
VP9GR	Frank Angelo
VQ9GP	G. Preno
VQ9R	C. Reder
VS6AI	G. Flenner
VU2DK	Zal Kabraji
VU2NP	Dos N. Paymaster
VU25KV	Vincot
XE1JM	Julio Monroy
XE1RX	Manuel Lutteroth
XE1SA	Manuel Ortiz
XW8AX	Bill Mitchell
YB3AAY	Jesse Marino
YN3FP	Francisco Pereira
YN3RBD	R. Dillard
YU2CDS	Radio Club
YU2QLS	Slavko Dzalto
YV1AQE	Willy Petterson
YV1ACC	Jose Alberto Nava
YV1ACX	Candido Carrasquero
UV1CB	Carlos Bernardoni
YV5AS	V. Rainer
YV5ASH	Roberto Santos
YV5GU	Pablo Miliani
ZF1AO	G. Smith
ZL1AOY	I. Young
ZL1DN	J. Oliver
ZL1DW	Malcolm Pryor
ZL2AAV	R.L. Cooper
ZL2WC	Wayne Crabtree
ZL3ADQ	J.C. Hamilton
ZL4DS	D. Carr
ZL4JT	J.T. Jennings
ZL4ST	J. Jennings
ZS1DG	D. Glaser
ZS3B	Gerhard Schlorf
ZS6AD	L. Wildman
ZS6AJS	J. Hesp
ZS6ASR	A. Mirwis
ZS6BBW	Sam Manne
ZS6ML	R. Gunn
ZS6MM	H. Williamson
ZS6NM	Phil Miller
ZS6PP	E. Towers
ZS6RA	K. Mills
ZS6UR	W. Ruurds
4X4IK	Zion Habshoosh
4X4VB	I. Gavish
4Z4HH	Club Station
5WIAT	James Jerger
6Y5GB	George Benson
6Y5PB	Peter Blakeborough
8J1RL	Shyowa Base Arc
8R1W	R. King
8RIX	M. Singh
9K2AM	Mohammad Saleh Bahbehani
9M2IR	John Van Lear
9Q5BG	Guy Baron
9V1QM	Aw It Haw
9V1QY	Paul V. Hodge
9X5LR	L.F. Rouhard
9X5PB	B. Prasse
9Y4MB	Milo Barnhard, Jr.
9Y4VT	Cyril George Balwah
9Y4VU	Frank Brooker

NEW STATIONS

SSTV, PERSPECTIVE '76

by

Bill DeWitt W2DD

SSTV Editor, CQ Magazine

Eighteen years ago, Copthorne MacDonald, then an engineering student at the Univeristy of Kentucky, invented a system for slow scan television using amplitude modulation. Three years later, MacDonald developed his FM subcarrier system that greatly increased the immunity of the system to other signals and fading. The standards for slow scan adopted at that time remain today with only slight modifications.

In other words, the basic system designed by MacDonald to fit the bandwidth requirements of the amateur allocations has remained, a cornerstone even though many changes have taken place in the meantime.

What are these changes, why were they made, and in what further changes should we look forward to in the future?

Many early slow scanners used flying spot scanners, simpler to build than a camera, but accomodating only flat transparent/translucent subject matter. As vidicons and plumbicons * became more available, cameras stole the show (pun intended!) and the range of subjects was broadened to just about anything.

Shuttered cameras employing a brief exposure of the vidicon followed by an eight second read-out scan preceded the sampling approach still used extensively today.

Fast to slow scan converters brought still another change to SSTV as "surplus" CCTV cameras became available.

The basic designs of several early monitors have held up well over the years. Tube designs have been converted to transistor configuration. The use of PC boards and IC's with their increased availability at lower cost levels has resulted in more compact P-7 monitor units and a reduction in the number of necessary controls. But the mail improvements in monitor performance seem to be better stability and imunity to unwanted signal/noise disruptions of the crucial sync pulses.

Perhaps the introduction of the keyboard for graphics should be listed as a convenience item at this point, but its value as a part of sophisticated oncoming systems will be mentioned later.

I am inclined to regard some of the items mentiones so far as evolutionary changes in a slow scan hardware and operating techniques, but let's put a different label on scan conversion.

Regardless of the mode used for scan conversion, its presence as a viable, available means of viewing slow scan on a TV set has enormously increased the interest of hams in SSTV. SSTV The frame grabbing capability (involving both fast to slow and slow to fast conversion) incorporated in some converters also makes SSTV more attractive to the average ham. Quick smiles and fragments of action captured in a sixtieth of a second fast scan field are a delight to those turned off by the "Daguerreotype freeze" required by sampling cameras.

Scan conversion also made practical a four fold increase in picture resolution by the use of a 256 line 34 second frame that frequently yields the added benefit of reduced multipath effects. One more reason for lebeling scan conversion a revolutionary change is because it involves the use of a memory system. Once the video information is in a memory, it becomes much easier to do something To it, or WITH it. This is a fact of freat significance and we have only seen the beginning of what it will lead to!

Where is our system lacking? What do we need? This may be an imperfect listing, but for example: Furthur improvements in sharpness and immunity to interference; a house syne system to make special effects possible by intermixing and positioning various video inputs; improved "human engineering" and simplification of controls for receiving and transmitting pictures.

And finally, one compelling need: Continued encouragement for those capable of making these needed developments! So far, bandwidth limitations have offered a challenge--but new and greatly increased information carrying capabilities should not go down the drain due to lack of support for added bandwidth and adequate experimental frequency allocations. Systems now under development call for bandwidths in the order of 15 Khz. Let us hope the ARRL will support and encourage our creative designers by recommending FCC approval of STA's in the UHF/VHF ranges when the time comes for on the air testing!

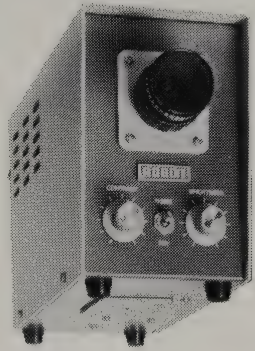
Anyone who made the scene at Dayton last year "knows" that we are going to see new and improved color transmission methods, keyboard accessed microprocessor controlled systems with SSTV/VIDEO DISPLAY/CW/SMOKE SIGNAL? options, and intermediate line rate frame time proposal, plus who knows what other goodies at this years Hamvention.

Slow scan development effort so far has been highly productive and mainly directed towards the real needs of the system. It has been remarkably free of the redundancy prevalent in other sreas of ham radio design activities.

With the progress that has been made so far, we have reason to be optimistic for the future. So, summing it up, Cop MacDonald got us off to a heck of a good start, LETS KEEP IT ROLLING!!

ROBOT MODEL 80A SLOW SCAN TV CAMERA

- **HIGH SENSITIVITY SEPARATE MESH VIDICON.**
- **BUILT-IN MODULATION CALIBRATOR.**
- **MAXIMUM RFI REJECTION.**
- **VIEWFINDER FAST SCAN OUTPUT.**
- **1/4–FRAME, 1/2–FRAME SELECTOR.**
- **BLACK/WHITE VIDEO REVERSAL.**
- **VIDICON BEAM AND SSTV VIDEO LEVEL CONTROLS.**



The Robot Model 80A Slow Scan Television Camera enables you to transmit live pictures of yourself, your station, QSL cards, drawings, or any printed material to fellow amateurs around the world. The camera, operating on your station desk or with a tripod, using normal room lighting or daylight, transmits clear, sharp pictures without involved adjustment.

Simply connect the Robot Model 80A camera to the Robot Model 70A or 70B Monitor and thence to the microphone input connector of your transmitter or transceiver with the cables supplied. Slow scan video from the camera consists of frequency shifted audio tones which modulate the radio transmitter just like the voice signal from a microphone.

The video level fed to the transmitter is adjusted by means of the output level control to produce the desired plate current.

SSTV transmissions with the Model 80A Camera are being successfully used with all makes of transmitters, including those with sweep tubes as final amplifiers. No change is required to the antenna or power supplies.

In the Robot Model 80A Camera, high resolution separate mesh vidicon tube is used. This tube is operated as a fast scan rate to achieve maximum sensitivity. The slow scan signal is generated from the fast scan video signal by a sampling process. As a result of this unique design, the Robot Model 80A Camera produces two video outputs; a fast-scan and a slow scan. By connecting the Robot Model 61 Viewfinder or the Robot Model 70B in the Viewfinder mode, to the fast scan output, the Viewfinder produces a picture that displays motion, is relatively bright, and permits rapid adjustment of camera focus and scene content.

The Model 80A Camera design features include 1/4, 1/2 and full frame selector switch, video reversal (black/white) switch, all solid state circuits and all aluminum cabinet.

SPECIFICATIONS:

	60 Hz POWER LINE	50 Hz POWER LINE
Frame Duration:	8.5 seconds	7.7 seconds
Line Rate:	15 per second	16-2/3 per second
Number of Lines:	128	128
Horizontal Sync Pulse:	5 milliseconds	5 milliseconds
Vertical Sync Pulse:	66 milliseconds	60 milliseconds
Deflection:	Magnetic	Magnetic
Focus:	Magnetic	Magnetic

Size: 3/8 by 3/8 inch (vidicon face)
Lens: Requires "C" mount type (not furnished)

Slow-Scan Video—Camera generates SSTV standard audio FM signal with amplitude adjustable from 0 to 2.5 volts peak-to-peak, output impedance 1K, and spectrum that meets published Bell System tariffs for voice couplers. Modulation standards are: White-2300Hz, Black-1500Hz, Sync-1200Hz.

Fast Scan—Camera fast scan sweeps and video are furnished at rear panel connector for driving the Model 61 Viewfinder, or Model 70 C or D Monitor in Viewfinder mode. Video modulation is baseband AM. Signal amplitude is 1 volt, black positive going. Output impedance is 1K. Vertical sweep is 3KHz (approximately 200 lines per frame) with 1 volt amplitude and output impedance of 1K. Horizontal sweep is 15 Hz (16-2/3 Hz in 50 Hz countries) with the same amplitude and output impedance.

PRICE ______________________ **$345.**

Lenses (C-Mount)

Lens	Focal length mm	Min f stop (all 22 max).	Min focus (inches)	Price
A	12.5	1.9	10	$ 75
E	25	1.4	6	$ 65
F	50	1.9	42	$ 85
H	18–108	2.5	48	$230

All lenses fit either Model 80A or any CCTV C-Mount Camera

ROBOT RESEARCH, INC.
7591 CONVOY COURT, SAN DIEGO, CA 92111 (714) 279-9430

REMEMBER ATV.....DIGITALLY THAT IS

DON MILLER W9NTP

In the past few years amateur television has taken on a completely new look. This has been brought about by the introduction of the digital scan converter. There are three ATV hams that have contributed to the design of these wonderful devices. They are W0LMD, Robert Suding, WB9LVI, George Steber and W6MXV, Mike Tallent. All of them have presented their designs at the Dayton Hamvention several times and published articles on their interesting circuits.

These memory systems can revolutionize ATV both in the fast scan mode as well as their publicized slow scan applications. It is the purpose of this article to show the many ways that memories can give potential of exotic slow scan, narrow bandwidth, fast scan and medium scan systems.

Figure one shows a typical scan conversion system. This scan converter can act as a frame grab camera when used with a fast scan camera for purposes of SSTV and also serve as a display of a recorded or transmitted SSTV picture on a fast scan television set. This is only the beginning however, and the real application shows up when a couple of memories are added to the basic system.

The original investigation began when the author designed a three color slow scan system based on the W0LMD digital scan converter design. The color system as it appears now at the 1976 Dayton Hamvention consists of a fast scan camera and a slow moving color wheel. The scan converter has three 128 x 128 x 4 memories where each of the basic primary color video signals is stored.

Let us consider the loading of the memory. The color wheel rotates at 300 RPM but does not require phase lock loop synchronization. This gives five revolutions per second. It allows a fast scan television camera to see four fields in green, four fields in red, and four fields in blue. Assume that the first field is frame grabbed and stored in the green memory. For the next three green fields the vidicon target is blanked out by a spoke in the color wheel so that the residual green field will not be retained during the upcoming red field. The fifth field sequence will be through the red filter and consequently stored in the red memory. This is followed by the blank out of three red target fields. When the blue filter rotates in front of the lens the video signal is stored in the third or blue memory.

The actual loading of the memory occured in 1/5 second. If it is desired to transmit a fast scan color picture (on the 70 cm or 450 MHz band), the readout of the memory can be at a normal 60 Hz rate. The only compromise made in the system over a conventional color camera is the lowering of the incoming data rate into the memory, from 60 Hz to 15Hz black and white rate (3 color fields per 1/5 second). The lower 15 Hz rate is fast enough for most all ATV applications. Of course the color memory outputs must be encoded for transmission but the expense of a color camera is avoided and the color registration is perfect with high light sensitivity. A system similar to this was used on the moon color camera.

Let us see how these three loaded color signals can be used for slow scan television. Here the data rate is lowered considerably, so once the memory is loaded the pictures are transmitted at an output rate of one frame per 8, 16 or 24 seconds depending upon the system chosen.

The simplest and most economical system is to transmit the picture stored in each memory sequentially over three, eight second periods. The picture at the receive end can be assembled with a color film camera or with the aid of a three memory scan converter similar to that used for the color transmission.

The system can also be used as a two color system (cyan and magenta) requiring only two color memories. The required transmission time is reduced to 16 seconds. This leads to a second method of transmitting a two color picture. This can be accomplished by transmitting the higher bandwidth color signal (green or cyan) in the same spectrum location as the usual black and white slow scan television signal. The lower bandwidth signal (red or magenta) is modulated on to a 500 Hz subcarrier located below the 1200 Hz slow scan sync pulse in the slow scan spectrum. This system allows for a simple two color picture transmission in an eight second time period. This system has much appeal because of its relative simplicity.

Finally the ultimate system uses a double sideband orthogonal subcarrier at 500 Hz. This allows two of the color memory signals (red and blue) to be transmitted on a single subcarrier. There are many variations of the encoding. These methods will be discussed at the 1976 Dayton Hamvention. The use of an orothogonal subcarrier reduces the transmission time of a three color signal to eight seconds.

W6MXV has another approach using subcarriers that may prove to be a winner. This will not be discussed in this article since no demonstrations have been given and it will serve as a suprise at Dayton.

CONTINUED..........

STEREO TV

If two memories are loaded from two identical cameras spaced five inches apart with each camera looking through a different color filter, stereo can be displayed. Each memory is filled with video information that is slightly different and if the output of these two memories is viewed on a color television set in either slow scan or fast scan, through colored glasses (one eye through a red filter and the other eye through a green filter) the image will show three dimensions. If this is done in fast scan the resulting image can have a data rate as high as 30 fields per second. If the image is viewed in slow scan it can be transmitted at a 16 or 8 second rate depending on the transmission format as previously described. The results are interesting and scientifically valuable.

The memory systems just described are very minimum systems for any display. They provide for 128 lines and 128 resolution cells (pixels) with 16 shades of grey (4 bit). This is enough storage for slow scan and low bandwidth fast scan systems but the use of multiple memories for color suggest that a truly good resolution black and white picture can be generated if two of these color memories are combined.

A field of fast scan television requires that 256 lines be available for display. In all of the scan converters previously described line doubling or line addition is used in the final pixel processing to give a smooth full line picture. These circuits are patterned after the work of WB9LVI.

The use of two memories with 128 vertical lines stored in each will give a true 256 line system. The horizontal resolution remains at 128 pixels, however.

Another thought to displaying higher resolution is to combine the two color memories horizontally to give 256 pixels in each line but only processing 128 lines in each frame. The display will show 256 lines again by line addition or doubling as previously mentioned. Tests show that this last system is more pleasing to the eye.

MOTION DISPLAY

Let us again assume that we have three 128 x 128 x 4 memories available for display. Slow scanners and fast scanners alike use too much bandwidth and time sending information over and over again to keep the TV display continous. There is really no need to do this. If a still SSTV picture is transmitted perfectly in an eight second period or if a fast scan picture is transmitted in 1/60th of a second, any other transmission of the picture is redundant information.

Motion means new information, so if the picture changes between fields only part of the picture that changed should be transmitted. A typical ATV ham usually sends his own image sitting in front of his desk or rig. It is not likely that his rig will move between fields. The movement is usually the image of his head or mouth.

This movement can be interpreted as new information and it can be easilly detected and stored with the aid of three memories. The first image or field is loaded into memory number one. Later, perhaps 1/60 second later, the second field is loaded into memory two. These two signals from memories one and two are compared for digital differences by outputting their signals through an exclusive or circuit which recognizes only differences in the two fields. These differences are loaded into memory three. It is now necessary to transmit these "changes" in less time that it would have taken to send the complete picture.

The author and other hams have exhausted themselves in designing systems that optimize the transmission of these "change" pixels. The best scheme is to rapidly look at each TV line from top to bottom to detect the first line that has a major change. The vertical address corresponding to this line is transmitted. The horizontal location of this change represents a horizontal address and this is transmitted next. The rest of this line is transmitted pixel by pixel until no more change pixels are found in that line. The converter then automatically goes to the next line without requiring a new vertical address. The next line is scanned for the first pixel change. The address corresponding to this changed pixel is transmitted. Again the changed pixels are transmitted along the line without requiring any more horizontal addressing. The process continues until no more horizontal lines with change are found. The use of this type of addressing transmits the changed pixels in a period less than eight seconds. These addresses can be transmitted on the 500 Hz cubcarrier similar to the transmission of color as previously discussed. Sync detectors have been left out of the discussion but are compatible with the 3 Khz allocated bandwidth.

Nor for one final use of a three memory system. Those readers that have watched slow scan know that the picture is changed "on the fly". The horizontal lines are changed from top to bottom as the picture is loaded into the memory or displayed on the P7 phosphor. If a true slide show is desired, one memory can be loaded while the other memory is displaying. In this way the memories can be altered to produce a continous changing slide show. Another variation of this is to plan on the transmitting station sending a sequence of the same picture. This is usually done on 20 meters to make sure that at least one of the pictures is received without QRM. The first picture is loaded into

CONTINUED...........

memory number one. The second picture is loaded into memory number two. These two pictures are added digitally (integrated to remove noise) and loaded into memory three. The third picture is loaded into memory one, followed by the fourth picture being loaded in memory two. Again these two pictures are added and combined with the integrated picture previously put into memory three. The final picture now preserved in memory three is the integrated sums of four identical pictures. In case four pictures are not sent in sequence, a double vertical sync pulse can be transmitted which will dump memory three of its contents eight seconds after the transmitted picture has been changed to a new scene. WB9LVI has produced some dramatic results with this field or frame averaging technique.

So much for the past years happenings, what about the future? The use of microprocessors will permit television scan converters to optimumly calculate the proper format and data rate for the bandwidth desired. This will permit the exact resolution or motion that is desired. This will be previewed and displayed in some form at the 1976 Dayton, Hamvention.

Build a digital scan converter. Write to WA9UHV for W0LMD boards or to W3LY for WB9LVI boards.

Bob Stone, W3EFG and his SAMPLEDOT system has much to offer for these low bandwidth systems. Bob will outline much of this work and show how it can result in a medium bandwidth system for hams at Dayton. His equipment will be on display which should excite your imagination.

In case you want to do many of the things previously described, you may want to try them with an analog scan converter. The model 300 Robot analog scan converter can store three pictures on a single mosaic and produce color pictures in much the same way as was described for the digital system. Get involved with slow scan and fast scan television groups and design, build and write articles. Remember what ATV hams always say, "Hams should be seen as well as heard!" Don Miller W9NTP, Waldron, Ind. 46182.

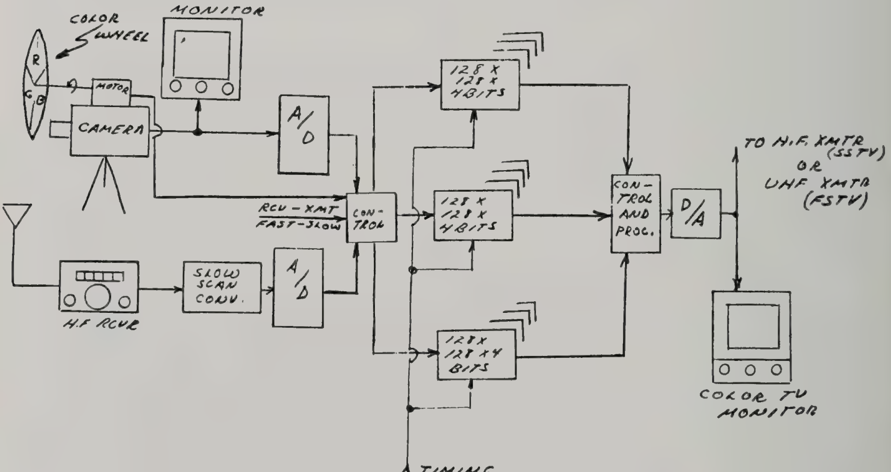


FIGURE 1

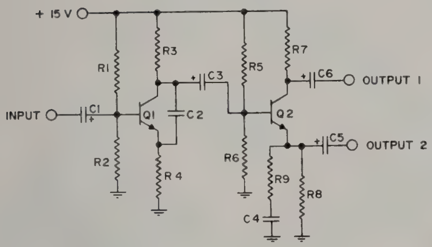
UNIVERSAL DIGITAL SCAN CONVERTER
FOR
COLOR-STEREO-MOTION-FAST OR SLOW SCAN
TELEVISION

W9NTP
3/9/76

a better way

A Better way. Jerry Flesher also associated with Topeka FM C & E has availed his services to Ham Junk shop and A5, by preparing a better and cheaper version of the video line amp described in the Dec. 75 issue of A5. The new version comes with a predrilled and etched pcb, and can be had in kit form or ready built. The newer unit also offers a wider input and output impedance range which is easily selectable by just changing resistor values. Power gain is aprox 50 DB and voltage gain is about 5 DB, so there is no problem using it to drive even the most stubborn of signal sponges. Send orders directly to Flesher Corp., address below.

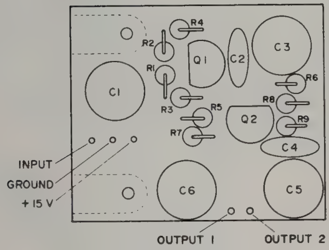
VA-1 VIDEO AMPLIFIER



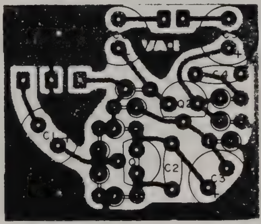
Input impedance	1K min.
Output impedance	100 max.
Input voltage swing	1.5V max.
Output voltage swing	7V max.
Voltage gain	7 dB typ.
Power gain	50 dB typ.

C1	47 mf	R4	82
C2	220 pf	R5	12K
C3	47 mf	R6	6.8K
C4	.001 mf	R7	100
C5	47 mf	R8	100
C6	47 mf	R9	100
R1	47K	Q1	MPS 5172
R2	6.8K	Q2	MPS 5172
R3	470		

FLESHER CORP.
P.O. Box 902 Topeka Ks. 66601



COMPONENT SIDE



FOIL SIDE

The VA-1 video amplifier has universal polarity selection and is eaisly modified for individual applications. The collector and emitter resistors of Q2 may be changed as required to determine overall amplifier gain and output impedance. A power supply with adequate regulation to prevent voltage changes with varying video signal loads, and capable of supplying up to 75 ma at 12 to 15 volts is required.

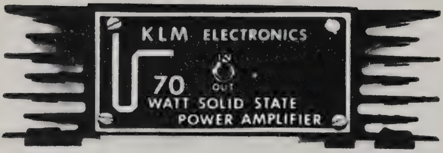
For a non inverting output, use output 1. For an inverting output, use output 2. The input impedance is around 1K ohms, so the input should be shunted to ground with an appropriate resistor if a lower input impedance is desired. Add a series resistor if higher input impedance is desired. The input level should not exceed 1.4 volts, as clipping will result. The output level is determined in part, by the load impedance of the circuit to which the amplifier is connected. The output impedance may be raised by raising the values of R7,R8, & R9 equally, and keeping the time constant R9•C4 unchanged. The output impedance will be approximately equal to the new values of R7,R8,R9.

CONSTRUCTION

Use only a small wattage soldering iron (25 watts or less) with a fine tip to avoid damage to the circuit board. Use the component location drawings and the parts list to assemble the VA-1

When mounting the amplifier, keep all leads as short as possible and use shielded wire for the input and output connections. Mount the VA-1 away from the horizontal output circuit to avoid interference. Connection to the TV video amplifier circuit should be directly after the video diode or video low pass filter just preceeding the grid of the video amplifier tube.

Heathkit TV receivers will require two VA-1's, one for video amplification, and one biased to provide sync only amplification for the sync circuits. Other sets which separate the sync from the video IF will also require two VA-1's.



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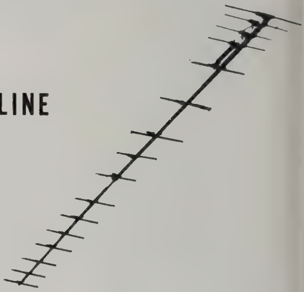

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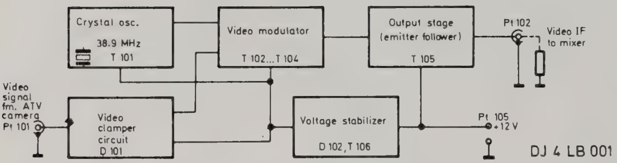

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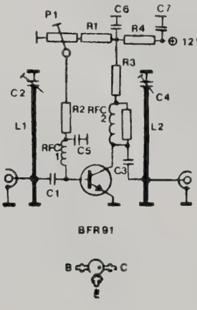
LOW NOISE 432 MHz PREAMP USING BFR91 BY ON5FF

On demand of many UHF- operators follows a complete description of my 70 cm preamp. Personally I feel that if more stations could use similar preamps, more DX- contacts would result.

The BFR90 series are transistors for RF and Mixer applications up to 3000 MHz the BFR91 being a particular good one on 432 MHz, as the input impedance on 70 cm in grounded emitter configuration is about 75 ohm pure resistive. The output impedance is also 75 ohm, a little capacitive. Fig. 1 shows the circuit, working completely stable due to the efficient choke system RFC2 - R3 and the low tapped transistor input and output. Feedtrough c's are not used as they could become resonant at frequencies higher than the 70 cm band ; instead of them 600 V chip c's are used. The "chips" are rated 600 V because of their thickness, making it possible to solder them to the chassis, easier than thin ones. The tuned circuits are using 0,5 mm brass striplines. The BNC connectors are soldered to the bottom of the box, making connections as short as possible. The leads of the BFR91 are cut about half To solder the decoupling c's C5 + C6, drill a 2 mm hole in the box, tin it, and solder the capacitors quickly against the hole. The emitter lead may not be more than 1.5 mm long, but please solder fast !

Tuneup : tune L1 + L2 with a griddip to 432 MHz and set P1 half coarse. Connect a noise generator ; tune L2 to max receiver noise output. The noise figure should then be about 2.5 dB. Tune L1 and P1 to min noise fig. , 1.8 dB. The collector current is abt 2.2 mA at 5V.

Fig. 1.



C1, C3, C5, C6	500	pF	600 V chip
C2, C4	6	pF	
C7	4,7	nF	
R1	10	kOhm	
R2	22	kOhm	
R3	1	kOhm	
R4	2,2	kOhm	
P1	10	kOhm	
RFC1	10 turns 0,3 Cul03 close wound		
RFC2	12 tr 0,3 Cul on 1k 0,25 Watt		
L1, L2	8 x 59 0,5 brass tap 13 from earth		

As the burnout emitter base voltage is 2 V, the unit should be protected from any RF, use a coax relay with receiver short circuit during transmit. Do not use protection diodes at the input : Their (small) additional capacitance will change the input matching and degrade the NF by more than 1 dB.

432 Preamp

As the noise figure of this preamp is 1.8 dB and the gain 16 dB it is well suited to be mounted on the antenna feedpoint. It will work as good or better than a good parametric amplifier mounted at the coax terminal. The amplifier works completely stable, even with the aerial disconnected. Due to the exellent performance of this little thing I was able to hear VE7BBG via EME abt 1 dB above the noise, with an AF379 or a similar one it should have been impossible !

When the transistor receives a signal over the burnout voltage the NF will be degraded by abt 2 dB, but the emitter - base and collector - base internal "diodes" will not necesarly destructed, so be very carefull.

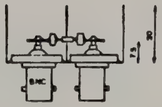
Measuring equipment used : - home made gate dipper
- Rohde und Schwarz SKTU noise generator.

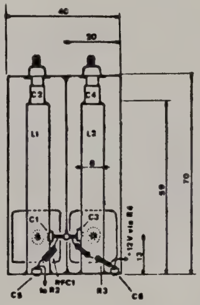
I hope that if you build it you will enjoy its performance. I apologise for the faults against the language. I will answer any questions about it and I wish you happy building.

SEE YOU ON 70 !

Mark De Munck ON 5 FF
Koning Albertlaan 126
B - 9000 GENT

Belgium





HAM PR

At a hobby exposition on Sunday afternoon, January 25th, sponsored by the Plainedge Public Library in Massapequa, N. Y., members of the LIMARC ATV technical group gave an on-the-air demonstration of amateur television two-way transmission between W2WLS/2 and W2NIP. Amateur color transmissions were also demonstrated as was a complete solid state ATV transmitter developed by W2TRP. Other participating ATV'ers were WA2APJ, W2ZUC, WA2FHF and W2KPQ.

Also shown were exhibits of slow scan TV, repeater operation and an exhibit of a precision radio controlled boat built by WB2AQM. Stan Zak K2SJO, director, Hudson division ARRL was present at the ARRL table and was assisted by W2TD.

K2QPF, EC for the town of Oyster Bay, demonstrated traffic handling during the SET on that date. Other groups who joined in with exhibits were Wantagh Radio Club, Farmingdale RC, and Long Island DX Assoc. represented by WA2BVU and W2AWK. Amateur radio in the scouting movement was handled by WB2YYV. Outside the library a mobile van containing an OSCAR satellite terminal was manned and demonstrated by K2REC and WB2AMX.

The show was very well attended by many people who were drawn in by newspaper, cable TV and word of mouth advertising. K2LIO LIMARC president and W2WKV who organized the event for LIMARC feel that cooperative effort made by many radio groups such as this can bring much positive interest and credit to the amateur radio image.

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Lens Mount	C-mount
Power Requirements	117/220/230 V, 50/60 Hz
Power Consumption	17 W (including viewfinder)
Dimensions	9 1/16" H x 4 5/16" W x 15 5/16" D
Weight	7.9 lbs
Optional Accessories	Standard lens (16 mm, f 1.6); 15–45 mm zoom lens, 2:1 sync. gen.
Viewfinder	
Cathode-Ray Tube	3½" (E2019B4B)
Resolution	More than 350 lines
Power Requirement	12 V DC (supplied from UC-2 Camera)
Power Consumption	5 W
Dimensions	3¼" H x 4¼" W x 10 1/16" D
Weight	2.2 lbs.

Camera	
Camera Tube	⅔ inch (16.9 mm) separate mesh type vidicon
Scanning System	Random interlace (2:1 interlace possible with external sync)
Horizontal Frequency	15.75 kHz (EIA)
Vertical Frequency	60 Hz, unlocked to power line (EIA)
External Sync	Switch selectable
Horizontal Resolution	More than 450 lines (at screen center)
Signal-to-Noise Ratio	Better than 42 db
Nominal Object Illumination	25 ft. candles
Sensitivity Control Range	10 to 10,000 ft. candles **Automatic**
Video Output Signal	1.0 Vp-p composite video signal, 75 ohm unbalanced, (0.7 Vp-p without sync signal possible) sync negative,
External Sync Input	1.0 Vp-p composite video signal or 2 to 4 Vp-p composite sync signal, negative polarity, 75 ohm

#5610 - Singer UC-2 Viewfinder TV camera. 3 piece ensemble comprising TV camera, 3 1/2" electronic viewfinder and Cosmicar TV zoom lens 15-45mm Fl. 8. Camera without lens normally $675.00; Cosmicar C-4518MZ lens - regular $165.50 plus rear control mechanism for zoom lens - regular $150.00; Total value $990.50 -- Less than 1/2 price. Only $399.95 complete, brand new.

#5611 - Above camera with Viewfinder less lens $299.95

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THE CANADA REPORT. . .

by George Davis VE3BBW

The publicity being given to FSTV and the growing numbers of hams joining the field is encouraging. A flurry of activity in half a dozen areas has led to more one way and two way contacts. A full page spread in the Belleville Intelligencer on Dec. 30 describes the activity with accompanying photos. The story covers the success of Howard VE3RL and Ron VE3GAB. DX is out to seven miles and they have been recently joined by Glen, VE3CJG.

In the Burlington area, the boys sparked by Frank VE3EEL are experimenting with converters, pre-amps and antennas. Incidently, the Blonder-Tongue BTX-111 is super. Grimsby VE3CCY, Brantford VE3LU, Mont Hope VE3DVV and Hamilton VE3CYC have all made point to point contacts while local activity in Burlington is high.

In Toronto, we have been joined by VE3DHL who has received VE3BBW's signal via apartment tower bounce in Kleinburg, while Ben VE3EYB who gave up transmitting in 1970 when no one came back with a pix and his buddy, Bob VE3EHY,will be operational before Jan 30. Serge VE3CHZ is ready to go as soon as he changes QTH in Feb. A test from Simpson Tower to Don Mills was disappointing.I forgot to put the xtal in the portable transmitter!! A special article on the portable is planned for a future issue.

Dan, VE3FOV,has finally made it on 439.25. He has successfully transmitted pix to VE3BBW and VE3CDM using the T-44. Quality was poor but Dan is working on a few mods to improve the link.

From Erie, PA, W3PSO transmits daily from 2130 to 2300, while our old friends Ray and Walt in Buffalo meet with us every Sunday at 1100 pm 3802 to update and test on 439.25. Yes, everybody is working on 439.25.

coming soon » 1215

Years ago it was "use it or lose it" for 5 meters. Then 220.....then 450. Now it appears that with the allocation of a large band to land mobile on the bottom doorstep of 1215, we may have another "use it or lose it" battle for 1215-1300.

A-5 is preparing a series of articles on building various equipment for 1215 starting with the next issue. Other articles will cover water cooling the 2C39 for higher power with less strain, a "Super Tuner ATV style for 432, hints on a better W0MZL video modulator and a review on a new entry in the 432 antenna field which appears to offer more gain than the wide space extended colinear with less weight, less size and less cost! All this and more in **future** issues of A5,the only US ham magazine for ham TV.

A5 ANTENNA RETURNS.....AGAIN

Many of you may recall that a Mr. Osipov used to build a powerful ATV antenna with loving care. Now, Frank Harrison K2MQG has taken up the gauntlet and is building the same ant. Quality and Performance were the main features of the A5 antenna, and nothing has been shortchanged by Frank. There are special considerations which make it necessary for Frank to have orders for several antennas before he builds each batch to keep the cost down. So, if you want a"DYNOMITE"450 antenna, write Frank at 105 Erica Rd., Lakewood, NJ, for complete details (08701) and maybe he can afford to put in a small ad in A5 Magazine. The EFFORT is NON PROFIT and is a hobby service provided to help those with ATV interests who cannot or do not want to build their own antennas and are tired of using commercial aluminum dummy loads that meet spec, on a windy day in full fog under a full moon at mid day under six feet of snow. (No deposit required with order, only your word and promise to pay for it when production starts) Approx. $25 for 14 db post paid; quad kits and harness, splitter, frame available too.

HAM PSA

A 60 second TV PSA has been produced by WB8HEE for distribution to commercial TV stations for their use with the theme, "Ham Radio is more than talking on a Radio". Spot emphasizes the fun aspects of ham tv, teletype, moonbounce, OSCAR, build-it-yourself. To obtain a copy, send a spot reel with 2:30 of tape in a mailing container with return postage. Spot is available and produced on 2" quad only. No helical copies are available. Allow 2-3 weeks for dubbing and return. No charge.

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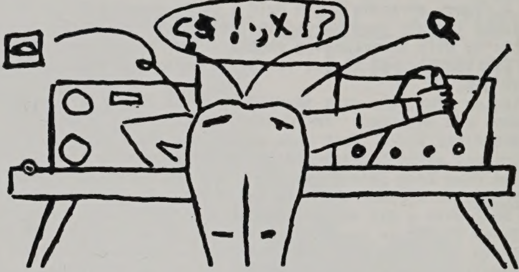

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GREATER DISTANCE WITH FAST-SCAN ATV : "S.A.T.V.".

In Germany, DC6Mr, Heinz Venhaus, is using a new system for fast scan ATV. He calls his system SATV (Schmall Band TV, schmall = narrow). In this system, the video carrier is also modulated n frequency with the phone signal, with a maximumof 15 KHz. The TV receiver IF bandwidth is only 500 KHz wide. This system, tested in cooperation with the Dortmunder Dezi-Gruppe, DC1DC and DC8VJ, was demonstrated in September of last year.

At the price of lower resolution the possibilities of communication over greater distances was increased. Video signals which with a wide receiver IF were not descernable from the noise were easilly viewed with the more narrow reeeiver system.'

To receive the audio, it is necessary to make changes in the TV receiver, use a seperate FM receiver or a seperate FM demodulator connected with the last pix IF.

SPECS.
Bandwidth 500 to 1,000 Khz.
Phone and picture signals on the same carrier.
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ADVANTAGES of SATV:
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Possibility of using present 450 MHz phone transmitter.
Possibility of greater distance QSO in video with the same input power.

DISADVANTAGES
Lower resolution of pix.
Changes to the TV receiver necessary.

ON4LP

* * *

KIDNAPPED. Clegg FM-DX slide bracket rivited to top SN # 056. ID# 141449314PH WB2ZSD Call 201-263-0376 Kevin Murry, Parisippany, NJ.

HELP HELP. Need a schematic or back issue covering cathode follower on T-44 Rcvr to feed TV set. John Jaminet, Valley VIew RD 1, Mechanics Burg, PA 17055 W3HMS

HELP HELP. Need schematic and service info relating to a Squires Sanders CCTV camera # SS-310. Allen Rees P. O. Box 1271, Norman, OK. 73069

* * *

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